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URUGUAY

SELECTED ISSUES

April 26, 2023

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ENSURING MEDIUM-TERM FISCAL SUSTAINABILITY[1]

Global public debt is at historically high levels raising questions about its sustainability and how it could be brought down. In Uruguay, the authorities' policies, together with a favorable macroeconomic environment, have led to a decline of the public debt-to-GDP ratio to pre-pandemic levels. Short term risks are low, and debt is sustainable, yet a sequence of unfavorable shocks such as a prolonged increase in international interest rates and a growth slowdown could lead to further increases in debt. This note explores ranges of public debt that would increase fiscal buffers and provide room for maneuver in the event of negative shocks or to respond to higher spending needs. It also explores fiscal consolidation measures that could generate the savings needed to lower debt.

A. Context

1. Uruguay strengthened its fiscal framework during the pandemic, at a time when most countries were either activating escape clauses, suspending their rules or modifying targets. According to Davoodi et al (2022), only 20 percent of the countries with fiscal rules did not make changes to their frameworks during the pandemic, while most countries invoked escape clauses to relax their fiscal rules. In this context, Uruguay stands out for strengthening its fiscal framework during the pandemic by: (i) establishing a new fiscal rule based on three pillars (structural deficit, real primary spending growth, and net indebtedness), (ii) creating a Fiscal Council and Committee of Experts, (iii) starting to preset rolling 5-year projections on an annual basis, and (iv) introducing stochastic debt sustainability analysis. The authorities also improved their communication strategy and increased the frequency of reporting on their policies and compliance with the targets of the rule.[2]

2. Moreover, the authorities have managed to reduce public debt in the aftermath of the pandemic through a combination of fiscal prudence and strong macroeconomic performance. Non-financial public sector (NFPS) debt peaked at 68.1 percent of GDP in 2020 and has since then come down to 59.3 percent in 2022, below its pre-pandemic level. During this period the NFPS primary balance moved from a deficit of 2.7 percent of GDP without *cincuentones* to a deficit of 0.6 percent of GDP in 2022 and is expected to reach balance in 2028.[3] The deficit reduction was achieved through a combination of spending restraint, in particular on public wages and pensions, and the positive effect of faster than expected growth and inflation. As a result, and in combination with a solid track-record of policy implementation, Uruguay's sovereign debt rating has consistently improved since 2021, reaffirming its investment grade status, while sovereign spreads are at historically low levels.[4]

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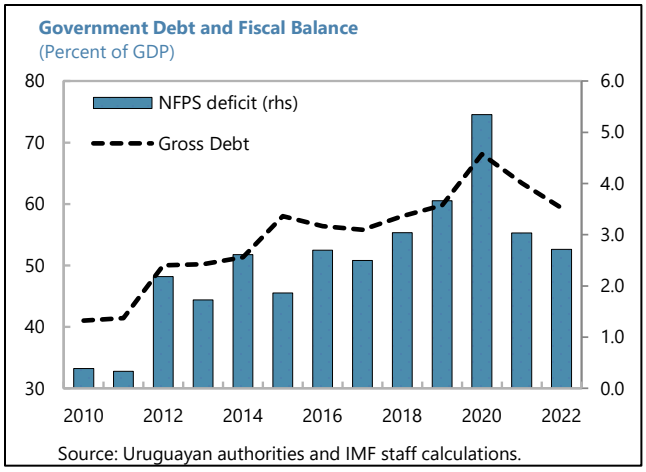
[1] Prepared by M. Belén Sbrancia (WHD).

[2] Previously, there was an annual presentation to Congress by the Minister of Finance referred to as "Rendición de Cuentas y Exposición de Motivos" to which now the authorities have added a presentation in February on the outturn of the previous year and their performance on the different pillars of the rule.

[3] The ongoing drought, the most severe in the last 30 years, is expected to lead to a temporary deterioration of the fiscal balance in 2023 relative to 2022.

[4] Fitch improved the outlook to stable in December 2021, while S&P increased the rating to BBB+ with stable outlook in April 2023.

3. However, from a historical perspective debt has been on an upward trend, in line with global trends. Following the sharp debt reduction following the 2002 crisis, debt declined to about 40 percent of GDP in 2010. Looser fiscal policy, combined with the end of the commodity super cycle in 2015 and a marked slowdown in growth, resulted in an increasing debt-to-GDP ratio, that reached about 60 percent of GDP in 2019. While the authorities have already managed to offset the increase in debt in the aftermath of the pandemic, the debt-to-GDP ratio would stay largely unchanged under their current projections (published in the annual report to parliament, *Rendición de Cuentas*). Uruguay's debt-to-GDP trajectory is similar to other emerging markets before the pandemic but compares favorably since 2019.[5]



4. The public sector DSA analysis shows that short-term risks are indeed low yet risks to debt sustainability increase in the medium-term as growth converges back to potential (see Annex V in the Staff Report). The change in the outlook for 2023-24 suggests that several headwinds could affect debt dynamics in the medium term, with events such as lower commodity prices and growth, high and persistent inflation, capital outflows from emerging markets, and higher borrowing costs amid a global slowdown affecting the projected debt trajectories. On one hand, there are several features of Uruguay's fiscal framework that mitigate risks such as the long maturity of debt at 12.9 years, high liquid buffers, and contingent lines with IFIs for USD 1.5 billion. On the other hand, the high share of non-resident holdings, and high share of FX debt increase the vulnerability of the debt ratio to shocks.[6] This raises the question of whether further efforts would be desirable to lower debt from its current level to rebuild policy space to respond to future shocks.

B. A Prudent Medium-Term Range for Public Debt

Rationale

5. Complementing the current fiscal framework with a medium-term debt anchor could further support medium-term sustainability. [7] Well-designed fiscal frameworks are structured around two main pillars: a medium-term fiscal anchor linked to the final objective of fiscal policy, and

[5] General government gross debt in emerging markets increased from 37.3 percent of GDP in 2010 to 56 percent of GDP in 2019. Unlike Uruguay, average government gross debt is about 10 percentage points of GDP higher in 2022 compared to 2019 in other emerging markets (see *Fiscal Monitor April 2023* and *Fiscal Monitor April 2022*).

[6] The share of non-resident holdings and the share of FX debt are both around 50 percent of the total.

[7] For more details on the changes made to the fiscal framework in 2020 and considerations for strengthening the fiscal framework see "Uruguay – 2019 Article IV Consultation" https://www.imf.org/en/Publications/CR/Issues/2020/02/20/Uruguay-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-49065

one (or several) operational target(s) on fiscal aggregates.[8] In addition, research has shown that countries with a debt rule managed to reverse a jump in debt faster than others (IMF, 2021).[9] In contrast to operational targets that are under direct control of the policymaker, the medium-term anchor is not.[10] Instead, it serves as a reference to guide the path of policies under a baseline and risk scenarios. The debt anchor is not meant to provide short-term guidance to policymakers but rather to inform medium-term expectations about fiscal policy. As explained in Eyraud et al (2018) the anchor should not be binding for the annual budget. Public debt is inherently persistent and affected by developments other than changes in the overall budget balance (for instance foreign exchange valuation gains/losses).

6. In the short term, this recommendation could be implemented by making an explicit link between the authorities' fiscal objective and their projections. As argued in Caselli and others (2022) a credible medium term fiscal framework can serve as forward guidance to annual budgets to be consistent with the medium-term fiscal anchor. Combined with strong institutions, it can allow for adjustments to the path of policies, while converging to medium-term reference levels. Moreover, frequent changes to the fiscal framework could undermine its credibility and raise communication challenges. Considering the current fiscal framework was revamped in 2020, it may be desirable to allow some years to evaluate the performance before introducing modifications. In the meantime, the annual "Rendición de Cuentas y Exposición de Motivos" could present an explicit link between the objective of fiscal policy in the medium-term (currently keeping debt stable at its current level) and the calibration of the three pillars of the fiscal rule: structural balance, real primary spending growth and net indebtedness.

7. Going forward, and once more experience with the current rule has been accumulated, adding a debt anchor to the fiscal rule could be considered. Other countries in the region have recently revamped their rules by including a debt anchor. For instance, both Chile and Colombia considered including a debt anchor to their rule: despite complying with the operational targets both countries saw public debt increase over time.[11] If a debt anchor was formally added, correction mechanisms could be used to specify a gradual transition path to return to the rule. This would allow for an effective response to large adverse shocks, while preserving the credibility of the framework over the medium term. Some countries have taken a step further and moved to incorporate state-dependent transition periods (for instance, Australia and Canada)

A Risk-Based Approach to Setting a Prudent Debt Level

8. The methodology used to calibrate a prudent range for public debt is based on precautionary considerations to incorporate risk assessment into fiscal plans. Several principles

[8] In 2021, 80 percent of the countries with fiscal rules had a debt rule in place.

[9] Paper by David, Goncalves and Perrelli (forthcoming) originally referenced in the October 2021 Fiscal Monitor.

[10] Despite this distinction, escape clauses are needed to respond to tail events or events which are truly outside the control of the government (Eyraud et al. (2018)).

[11] In the case of Chile, while not formally added yet, the rule would have a debt anchor (ceiling) of 45 percent of GDP for gross public debt, while Colombia set its debt anchor at 55 percent of GDP in June 2022

should guide the calibration of an anchor or prudent level (IMF 2018). The calibration should be comprehensive and consistent: there should be a clear relationship between the medium-term reference level and operational indicators. The calibration should be sequenced; where first, an anchor is set and then the operational variable is calibrated to be consistent with achieving that level over a specified period. Third, the calibration should be prudent to take into account a variety of risks and preserve buffers to respond to shocks. And last, the calibration should be updated regularly but not too frequently.

9. Three common definitions in the literature used in this paper are as follows:

- ***Debt limit***: is defined as the level point beyond which government solvency or liquidity is put into question, constraining the use of fiscal policy. Loss of control over debt dynamics.

- ***Debt anchor***: is set such that there is a low probability of reaching the threshold over a given time horizon if unfavorable shocks occur i.e., debt is in "safe" territory. Is the level consistent with safeguarding medium-term sustainability.

- ***Unsustainable debt:*** this situation occurs when "there are no politically and economically feasible policies that stabilize the debt-to-GDP ratio and deliver acceptable low rollover risk without restructuring and/or exceptional bilateral support, even in the presence of Fund financing."[12] In this context, it is important to make a distinction between unsustainable debt and debt that does not stabilize within the projection period. In the case of the latter, it is possible that a combination of policies eventually stabilize debt.

10. Determining a broad coverage for public debt is important to appropriately capture fiscal risks. The guiding principle is that a debt anchor should be set at broad levels to capture vulnerabilities that may arise beyond the central government, for instance from state-owned enterprises. In the case of Uruguay, the NFPS would be the most appropriate level of coverage. [13] However, initially, and to facilitate implementation, coverage could be set at the Central Government (CG) level with the intention to transition to the NFPS eventually. Using the CG as a starting point would also allow for consistency with other elements of the current rule such as the limit on the structural balance and on the growth of real primary expenditures.

11. Estimating a debt anchor requires determining either a debt limit or a policy limit. [14] There are two main approaches:

[12] Staff Guidance Note on the Sovereign Risk and Debt Sustainability Framework for Market Access Countries Staff Guidance Note on the Sovereign Risk and Debt Sustainability Framework for Market Access Countries (imf.org)

[13] In 2019, the authorities and the IMF switched the focus of fiscal reporting from the consolidated public sector (CPS) to the NFPS, see 2019 Article IV for more details (IMF Country Report 20/51). However, the current fiscal rule covers the central government and Banco de Prevision Social (CG-BPS) even if projections for the NFPS are also presented annually.

[14] There are several considerations to determine an appropriate debt limit such as: (i) the possible impact of debt on growth, (ii) improving credit ratings, (iii) maintaining low spreads.

- ***When the debt limit is known*:** the debt anchor is the highest debt level that with a low probability (usually 5-10 percent) would breach the debt limit in the medium-term. In this case, the concept of debt limit is associated with debt distress.

- ***When the debt limit is unknown:*** the objective is to identify the debt level(s) associated with policy limits. The rationale is that it is not politically or economically feasible to raise the primary surplus above certain level. Hence, debt becomes unsustainable if the needed primary surplus to stabilize debt becomes unrealistically high. The estimate is around 2-4 percent of GDP (Escolano, 2014).

12. Several methodologies are used to estimate a debt limit for Uruguay. The first method estimates a limit above which debt cannot be stabilized at times of fiscal stress. The intuition behind this method is that, in times of fiscal stress, policymakers cannot do "whatever it takes" to stabilize debt. This is the case because either tax increases may be ineffective beyond a certain point or because spending cuts below a certain level would be socially unacceptable. The literature approximates this level as the highest achievable primary balance (*PBmax*) to the interest-growth differential under stress (*r-g)*. Based on Uruguay's history, a *PBmax* of 3.5 percent of GDP could be achievable although the evidence for emerging markets suggests lower levels around 2 percent of GDP. [15]The level of the real interest rate-growth differential under stress based on a sample of emerging markets could be as high as 4 to 5 percent. This yields a debt limit of 70 percent using Uruguay's historical outturns.[16] Alternatively, based on a signal approach to determine the threshold above which the probability of debt distress increases, the previous IMF Debt Sustainability Analysis (DSA) had an indicative threshold of 70 percent for emerging markets. Last, several papers have studied the link between debt and growth.[17] Using the same theoretical model as that used in other countries in the region (Checherita-Westphal and others, 2014), where the maximum debt-to-GDP depends on the elasticity of output to the public capital stock, yields a maximum debt-to-GDP ratio of 63 percent for Uruguay.[18]

13. Once a debt limit is set, a debt anchor can be estimated based on the history of shocks. The exercise starts by estimating a distribution of macroeconomic and fiscal shocks facing Uruguay. The next step consists of generating 1,000 simulations of these shocks over a six-year horizon, and computing for each a debt trajectory based on a fiscal reaction function and the debt accumulation

[15] The average primary balance for the NFPS was 3.5 percent of GDP between 2003-2007.

[16] For comparison purposes, the evidence for emerging markets suggests lower levels of maximum primary balance around 2 percent of GDP, which would imply a lower debt limit of 50 percent.

[17] Chudik and others (2015) find that when debt surpasses a country-specific threshold between 30 and 60 percent of GDP growth slows down. Pattillo, Poirson, and Ricci (2011) show that this happens also when external debt surpasses 35 percent of GDP, while Cordella, Ricci, and Ruiz-Arranz (2010) find that the marginal effect of external debt on growth turns negative when debt reaches 25 percent of GDP.

[18] This methodology consists in using a stylized theoretical model that determines the growth-maximizing level of debt, taking into the impact of debt on public investment. The estimated elasticity for Uruguay is 0.2765 and was obtained with data from Penn World Table 10.01 and IMF's Investment and Capital Stock Dataset.

equation. The results are presented in a fan chart where the initial point is the debt anchor. More details on the methodology can be found in IMF (2018).

14. Under the baseline estimation, a debt anchor for Uruguay would be between 50 to 55 percent of GDP. Baseline estimations assume a debt limit of 70 percent and that the probability that debt surpasses that limit is lower than 10 percent. The maximum feasible primary balance is set at 3.5 percent considering the strong fiscal performance in the early 2000s. In that scenario, the calibrated debt anchor is 54 percent of GDP. Under staff's baseline, the probability that debt is higher than 70 percent of GDP is above 10 percent which is reflected both in the estimates for debt anchor and the fan chart.[19]

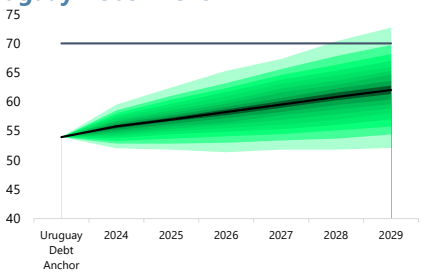
15. Under alternative scenarios, such as including contingent liabilities, lowering the policymaker risk tolerance, or lowering the debt limit, a lower estimated debt anchor is obtained. Several alternative scenarios are considered in a robustness scenario. For instance, increasing the size of contingent liabilities results in a debt anchor of 47 percent of GDP, while lowering the probability in which the debt limit is breached lowers the debt anchor to 51 percent. The table also presents the estimates resulting from a lower debt limit of 65 percent of GDP. In that case, the estimated debt anchor ranges between 38 and 47 percent of GDP.

Sensitivity Analysis of the Simulated Gross Debt Anchor

Parameters						
Debt limit	70	70	70	65	65	65
Contingent liabilities	0	5	0	0	5	0
Likelihood of exceeding the debt limit	10	10	5	10	10	5
Debt anchor	**54.0**	**46.8**	**50.7**	**46.8**	**38.4**	**42.6**

Source: IMF staff calculations

Uruguay Debt Anchor

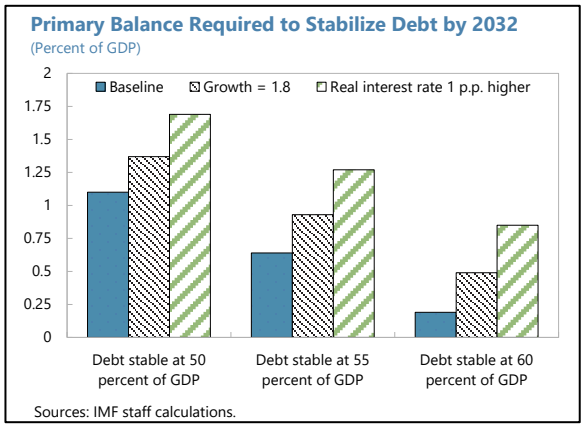


16. The associated primary balances that would be needed to reach a certain debt level would depend on the assumed transition time. Reaching the debt anchor at an earlier date requires a higher fiscal effort. At a minimum, reaching a debt reference level of 54 percent of GDP (which was the average value between 2012-16) by 2032 would require increasing and maintaining the primary balance by 1.3 percentage point. Alternatively, reaching a debt level of 38.4 percent of GDP in 5 years would require a primary balance of 4 percent of GDP. These results, combined with the evidence on sustainable primary balances suggest that some of these calibrations could be too ambitious and possibly counterproductive. A too large fiscal adjustment could have negative output implications which would in turn make the consolidation self-defeating.

Debt anchor	Primary balance to reach target by:	
	2028	2032
38.4	4.0	2.1
46.8	2.2	1.4
54.0	1.2	0.7

[19] See Annex V in 2023 Article IV Staff Report.

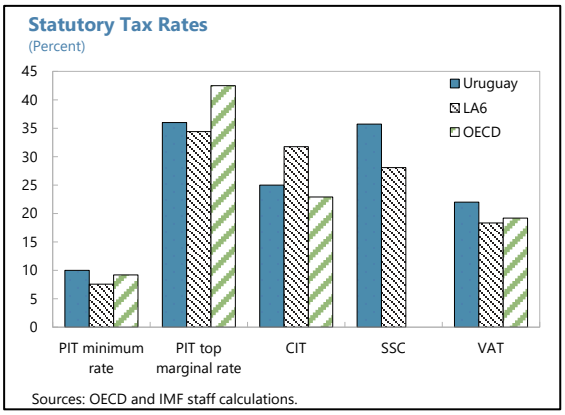
17. Alternatively, if the debt limit is unknown, primary surpluses between 0.6 and 1.7 percent of GDP would allow to stabilize debt between 50 and 55 percent of GDP.[20] An alternative approach would be to derive the level of debt that could be reached under alternative assumptions about fiscal effort. For instance, a constant primary surplus of 0.6 would allow to reach a debt to GDP ratio of 55 percent by 2032, while a primary surplus of 1.1 percent of GDP would allow to reach a debt to GDP ratio of 50 percent. Other scenarios can be considered by considering alternative underlying macroeconomic assumptions. For instance, if the average growth rate is set at 1.8 percent (the average between 2013-19) instead of 2.2 percent (staff's estimate of potential output), then a primary surplus of 0.9 percent of GDP would be consistent with reaching a debt ratio of 55 percent of GDP, and a surplus of 1.4 percent of GDP consistent with reaching a debt ratio of 50 percent of GDP. Under a scenario with higher real interest rates by 1 percentage point throughout 2023-2032, a primary surplus of 1.3 and 1.7 percent of GDP would allow to reach a debt ratio of 55 and 50 percent of GDP respectively. As a reference, a primary surplus of 0.2 would allow to stabilize debt at 60 percent of GDP (its current level). This effort would increase to 0.5 percent of GDP in the lower growth scenario and to 0.9 percent of GDP in the higher interest rate scenario.[21, 22]



C. Consolidation Options: The Composition of Revenues and Spending

Revenues

18. Uruguay has a relatively high level of tax revenues and statutory rates when compared to other countries in the region. Revenues have also increased over time following the reforms introduced in 2007 (Law 18.083) from around 20 percent in the early 2000s to around 27 percent in the last few years. The composition of revenues is similar to Latin America and Caribbean (LAC) countries in that revenues rely mostly on VAT and other consumption taxes with 40 percent of total tax revenue coming from that source

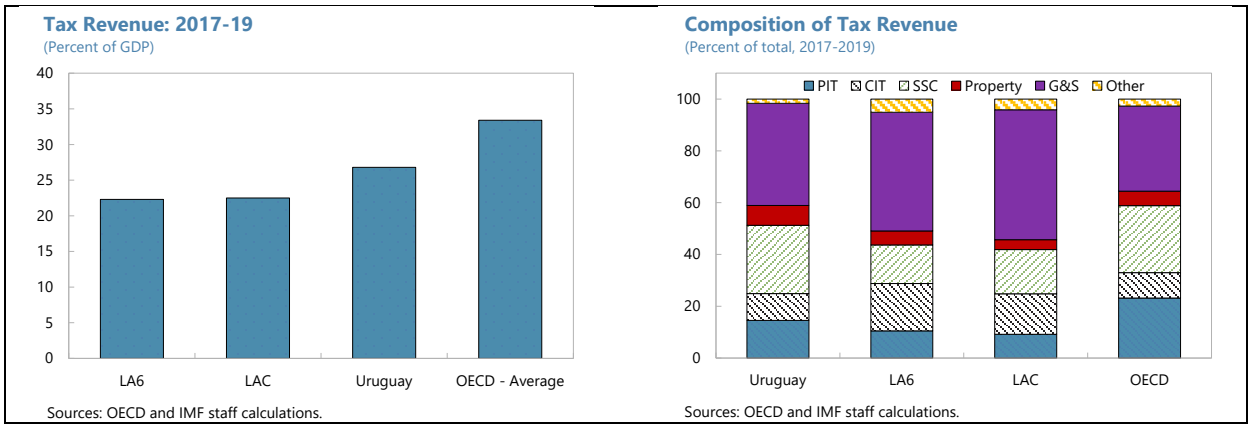


[20] This analysis was done with ICD's Debt Dynamics Tool (DDT). See Acosta Ormaechea and Martinez, (2021).

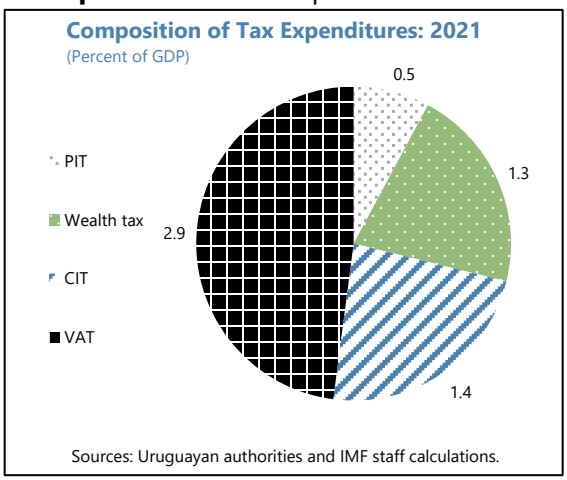
[21] Staff estimates that a 2-percentage point increase in the effective *marginal* interest rate would add 0.8 percent of GDP to the deficit, and about 2.4 percent of GDP to debt in 2028.

[22] The perimeter of the fiscal rule is CG-BPS which makes the primary balance results not directly comparable since the calibrations were conducted for NFPS. However, the fact that debt stabilizes under current fiscal plans suggests that further fiscal efforts will need to be made in order to lower debt to 50-55 percent of GDP.

compared to 46 percent in LA6 and 50 percent in LAC. At the same time, the high share of revenues from social security contributions (SSC) and low share of corporate income tax (CIT) is similar to OECD countries. Uruguay also stands out in the region for having a relatively high collection via personal income taxes (PIT). Uruguay's statutory tax rates are generally higher than those on LA6 countries except for CIT. When compared to OECD countries rates are also higher except for the top marginal PIT rate.



19. Increasing tax revenues may require reducing tax expenditures. Tax expenditures in Uruguay are relatively high, at 6 percent, compared to 3 percent in the average LA6 country.[23] However, measures of tax expenditure should be interpreted with caution as these also reflect the low level of tax evasion and informality in the economy.[24] The office of tax administration periodically reports detailed estimates of several tax expenditures, a prerequisite to evaluate possible reduction or changes in the different types of tax expenditures. The largest in magnitude are tax expenditures on VAT followed by those on CIT and wealth.



20. Recent initiatives to focus VAT exemptions and to reduce rates to recipients of social programs ("IVA personalizado") are steps in the right direction to reduce tax expenditures and the regressivity of the tax. With its initiatives to reduce the regressivity of VAT, Uruguay is at the forefront of policy implementation by focusing tax rebates to consumers in the lower end of the income distribution. Continuing with these efforts would allow to unify VAT rates, potentially lowering the standard VAT rate while at the same increasing VAT progressivity. A study by Pelaez (2022) shows the regressivity of VAT in Uruguay. The income of the three bottom quintiles declines after VAT given their higher share of consumption

[23] LA 6 includes Argentina, Brazil, Chile, Colombia, Mexico and Peru.

[24] DGI reports that estimated VAT evasion has fallen significantly since 2003 and stood at 1.7 percent of GDP in 2016.

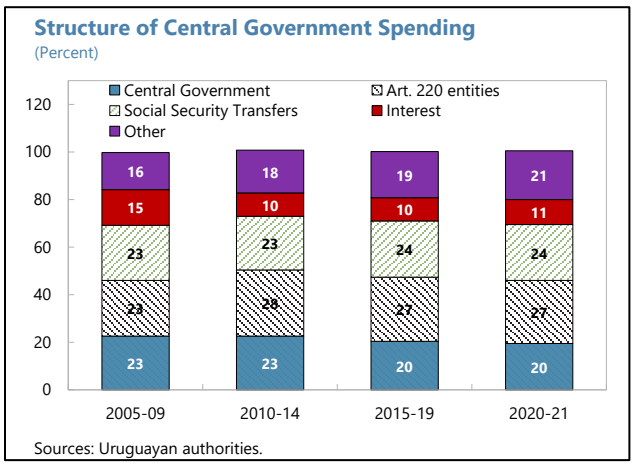
over income. Moreover, an additional important step would be to extend the number of recipients of social programs that receive the transfer via "tuapp" (a virtual wallet) rather than cash.[25]

21. An impact evaluation of tax benefits to promote investment would help assess any changes to the current regime. A report by OECD (2021) on investment argues that it is important to assess the extent to which investment that would have taken place anyway in the absence of preferential tax treatment. Some analyses have been conducted to assess the impact of COMAP but no studies have yet looked into the impact of free-trade zones.[26]

22. A review of the tax regime could allow to broaden the tax base to better reflect the current economic structure. Consideration could be given to extending the taxation of VAT to digital services between domestic consumer and global companies, in line with the transformation initiated in 2018.[27] Grau Pérez and others (2022) also propose changes to the VAT regime on agricultural transactions to eliminate for instance the "IVA en suspenso" by which the purchase of intermediate goods to produce agricultural products is exempt from VAT. This would lead to a one-time increase in prices but could also have a large positive impact on revenues.

Expenditures

23. The overall level of expenditure is fairly rigid. According to Vammalle and Rivadeneira (2019) only 20 percent of the budget's total expenditures are discretionary including operating expenditures, social transfers, and investment. In recent years, the composition of spending was as follows: about 24 percent of total spending were transfers to social security, 10 percent were interest payments, and 26 percent were transfers to Article 220 entities.[28] Out of the remaining categories, the largest amount is spent in wages (about 18 percent of total spending). Hence, generating savings would require changes to the more rigid items of spending.



24. Public wage expenditure as percent of GDP has fallen since 2020. In the last two years real wages have increased at a slower pace than real GDP growth: as a result, the wage bill as percent

[25] Current use of virtual wallets by vulnerable population is limited.

[26] The Comisión de Aplicación de la ley de Inversiones (COMAP) regime was created under the Investment Promotion Law to grant tax incentives. The incentives are not automatically granted, they require a project-based evaluation by the Uruguayan authorities.

[27] Law 19.535 and decree 144/018.

[28] Spending by Article 220 entities has increased in recent years due to higher expenditure rates and creation of new Art 220 entities. The largest (in terms of spending) Art 220 entities are: ANEP, ASSE, UdeLaR, INAU and the Judicial Power.

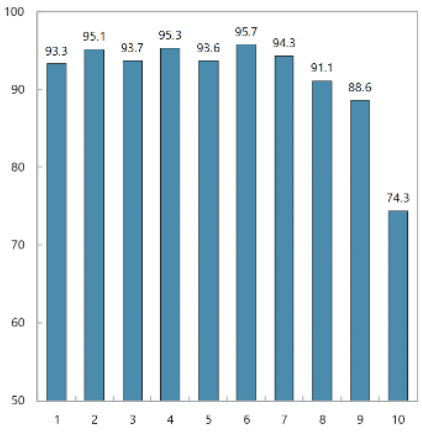
of GDP experienced a reduction from 5.2 percent of GDP in 2020 to 4.5 percent of GDP in 2022.[29] To the extent that real wages continue to grow at a lower or similar pace than GDP this would allow for these savings to be preserved into the medium-term. However, the authorities' commitment to at a minimum recover real wages to their pre-pandemic level (in December 2019) could erode some of the savings achieved in recent years.

25. The number of public employees grew at 2.3 percent on average during 2003-2014 although it has more recently has stabilized. During 2003-2014 the number of public employees grew by almost 30 percent, from 241,000 to 308,000. In the years prior to the current administration taking office, the size of the government continued growing albeit at a slower pace. In 2020, the authorities approved a decree mandating that only one out of every three public sector vacancies would be replaced in non-essential sectors. This policy was also in place in 2021 allowing for a reduction in the number of public employees in 2020 and 2021 of about 2 percent. If the number of public employees declined to its 2003 level, it would generate savings in the amount of 1.3 percentage points of GDP. While such reduction may not be feasible nor desirable, it is a useful benchmark for possible savings for civil servant reform. Recent initiatives to reduce absenteeism of public employees and improve the efficiency of disability insurance could allow for a better allocation of resources.

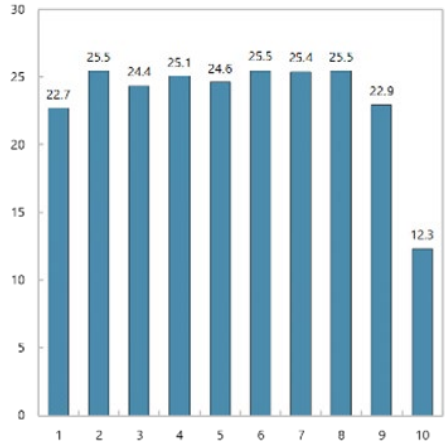
26. Pensions is the single largest spending item.[30] The increase in pension spending in the last 15 years is explained by a combination of wage growth and more flexible requirements to access retirement benefits.[31] The recently approved reform would stabilize spending over the medium term.

Supergas Use by Household Income Deciles

Use for Cooking (Percent)



Use for Heating (Percent)



Source: Uruguayan authorities and IMF staff calculations

[29] The average annual increase in real public sector wages was 2 percent between Dec-2009 and Dec-2019.

[30] See Annex VII for a discussion of the recently approved pension reform.

[31] Law 18,395 of 2008 allowed for reduction in the required years of service, expansion of benefits to old-age benefits to those 65-69, and an increase in women's pensionable service of one year per child (up to a maximum of five years).

27. While spending on social programs is largely well-targeted, a redesign of energy subsidies would lead to large savings. Most of the social public spending goes to pensions and social security with about 5 percent of total spending allocated to programs such as *Plan Equidad* and *Tarjeta Uruguay Social*. Therefore, reductions in the amount allocated to social programs are not feasible nor desirable. However, improvements to the subsidy on LNG would lead to large savings.[32] Data from the consumer survey (ECH) shows that consumption across deciles is fairly flat except for the richest one. However, the average price is below market prices. A redesign of this subsidy would allow for better targeting. Recent changes in this direction are welcome: since 2022, the price paid by beneficiaries of social plans is half from that paid by all other consumers.

28. There is scope to continue improving the efficiency of state-owned enterprises (SOEs). SOEs are profitable but their contribution to the fiscal accounts has been on average declining over time. Companies are required to be profitable and pay dividends to the government. At the same time, they are required to pursue social policies which are not always profitable, not funded transparently from the budget, and therefore involve cross subsidies. Developing a strategy to optimize shareholder value while achieving socioeconomic goals would be a useful first step to evaluate SOE results and identify inefficiencies (or the cost of cross-subsidies) to be translated to the final consumer. Improving the governance of SOEs by having them be professionally managed, allowing for tariffs to be cost reflective, and granting them operational independence could increase their efficiency.

29. Public investment has remained relatively low since 2015. This is also reflected in the stock of public capital as estimated in the IMF Investment and Capital Stock Dataset. These estimates show that the stock of public capital has remained constant in the last decades, while the stock of private capital has been increasing. Even if some projects can be partly financed with private capital, public funds will likely be needed also to maintain and improve the quality of infrastructure.

30. Improvements to the medium-term fiscal framework to reduce its fragmentation could lead to higher spending efficiency and more control over spending in critical areas such as education and health. Article 220 of the constitution allows some autonomous entities greater flexibility on the management of their budget and to present independent budget proposals to the legislative.[33] Some of these entities often coordinate with their line ministry their budget proposal, but these proposals have often requested higher spending than that proposed by the Executive. Besides fiscal sustainability considerations, having education and health policy decisions decentralized as they are now, creates challenges to have nationally coordinated policies and creates potentially spending inefficiencies.

D. Conclusions

31. Uruguay has made important progress in recent years to strengthen its fiscal framework. The country's experience serves as an example on how a credible framework can be

[32] As reference, this subsidy averaged US$90 million in the last two years.

[33] See footnote 23.

useful to provide an effective policy response to adverse shocks such as the pandemic, and how achieving the targets of the rule can be helpful to reduce debt following a shock while maintaining market access and financing at favorable terms.

32. Going forward, Uruguay's fiscal framework would benefit from adding a medium-term anchor to bolster its credibility further and allow for a reduction in the debt level to increase fiscal space. Fiscal space is needed to respond to future shock but also spending needs in public investment and to finance climate change transition cost will require savings relative to current spending. In the short term and considering that the implementation of the current rule is relatively recent, this could be implemented by making an explicit link between the projection for the medium-term and the authorities' fiscal objective. Going forward, introducing an explicit debt anchor could be considered.

33. A risk-based approach yields a debt anchor between 50-55 percent of GDP. This range is obtained by combining the results from a stochastic analysis, that considers the distribution of Uruguay's history of macroeconomic and fiscal shocks, and an assessment of feasible primary balances that would be politically and economically sustainable.

34. An analysis of the structure of revenues and spending suggests possible measures to reduce the fiscal deficit. A reduction of energy subsidies and a full implementation of targeted VAT would increase the efficiency of spending and lead to non-negligible savings. Besides these, other measures could allow to generate further savings. On the revenue side, an impact analysis of the cost and benefits of tax benefits to promote investment is needed to determine whether their cost is justified or whether there is scope for some savings. On the spending side, deepening the reform of SOEs would increase efficiency but also allow an assessment on the cost and benefit of cross-subsidies that are not currently accounted for in a transparent manner. Reducing budget fragmentation is important for fiscal sustainability reasons as spending by Article 220 entities represents a significant share of total spending, but also to better coordinate public policy on critical areas such as education and health. Finally, it would be important to preserve the savings in wages that have been attained in recent years and explore how the implementation of the public employment attrition rule can help lower spending until a civil service reform can be undertaken. Spending on public investment, already at low levels, should be preserved.

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DRIVERS OF FINANCIAL DOLLARIZATION AND THE ROLE OF PRUDENTIAL POLICIES[1]

Uruguay has one of the highest levels of financial dollarization among WHD economies, both for deposits and loans. Although high inflation and large devaluations have traditionally been linked to high levels of dollarization, structural factors are also important to explain the persistence of dollarization in Uruguay. In addition to improving the monetary policy framework, and delivering low and stable inflation, deploying currency-differentiated reserve requirements should be considered when designing a comprehensive de-dollarization strategy.

A. Introduction

1. Dollarization has been a long-standing feature of the Uruguayan economy.[2] The wide acceptance of the dollar in the Uruguayan economy dates back to the 1960s when dollar deposits started to be introduced as a safer store of value. As in other countries in the region, dollarization was triggered by periods of high inflation and currency depreciation, eroding the confidence and demand in the local currency. In Uruguay, financial dollarization peaked after the 2002 crisis, when the exchange rate peg system was abandoned and the Uruguayan peso depreciated. Despite achieving somewhat lower and more stable inflation since then, with the implementation of an inflation targeting regime since 2005, Uruguay still exhibits a high level of dollarization in both deposits and loans, one of the highest in Latin America.[3]

2. Dollarization affects the transmission channels of monetary policy. It poses both financial stability risks and challenges the effectiveness of the interest rate channel (Acosta-Ormaechea and Coble, 2011). Dollarization might strengthen the exchange rate transmission channel to domestic prices, weaken the interest rate channel, and limit the ability of monetary policy to control domestic prices. A significant share of loans and deposits of the banking system are in dollars, and their interest rates are linked to international interest rates rather than domestic rates. This constrains, mechanically, the effect of the monetary policy rate on economic activity, creating a negative feedback loop whereby episodes of high and unstable inflation led to high levels of dollarization, and at the same time, high levels of dollarization hinder the ability to control inflation.[4]

[1] Prepared by Jesús Sánchez and Mauricio Vargas (WHD).

[2] The term "dollarization" has different dimensions. Some countries adopt full dollarization schemes, under which a country officially abandons its own currency and adopts a more stable currency of another country as its legal tender. On the other hand, some other countries have dual-currency economies or partial dollarization. Schemes of partial dollarization can also have different extents. For instance, *financial dollarization* is understood as the dollarization of financial contracts (usually loans and deposits), while the term *real dollarization* is used to identify economies with dollar denomination of price and wage contracts.

[3] Throughout this document, the analysis is focused on the factors behind the high level of FX deposits, thus we use deposit dollarization and financial dollarization interchangeably. Deposit dollarization is measured as the share of FX deposits in total deposits of the banking system.

[4] The relationship between dollarization and inflation has been extensively documented for Uruguay (see more references in Zacheo and Guenaga, 2019; Cuitiño et al., 2021).

3. The causes and persistence of dollarization go beyond exchange rate and price fluctuations. In addition to responding to an initial episode of high and persistent inflation and large devaluations, higher dollarization levels are associated to other structural factors as well (Garcia-Escribano and Sosa, 2011), such as: (i) lower credibility of monetary policy, (ii) lower economic development, (iii) lower financial system development, (iv) lower governance quality indicators, (v) higher financial and trade openness, and (vi) higher remittances inflows.

4. The persistence of dollarization has complex causes, but targeted prudential measures can help reduce it. Besides the role of structural factors and monetary policy, the results in this paper underscore that currency-differentiated reserve requirements could be an effective policy tool to de-dollarize the financial system. Other prudential policies aimed at minimizing financial risks from dollarization, such as differentiated provisions for loan losses and risk weights for loans in pesos and dollars, could be considered for designing a comprehensive de-dollarization strategy.

5. This paper provides new evidence on the drivers of dollarization and policies to reduce it. The relative merits of alternative policies and their effectiveness depends on country-specific characteristics, as well as possible complementarities across policies. This paper provides new evidence for a sample of Latin American economies including Uruguay. Specifically, the paper examines aspects of monetary policy and the role of prudential policies in reducing dollarization levels. The paper concludes that a comprehensive de-dollarization strategy should rely on the implementation of long-term structural policies, the enhancement of the current monetary policy framework, and the calibration of prudential policies.

B. Stylized Facts

Dollarization Trends

6. Uruguay has reached one of the highest ratios of FX deposits to total deposits among WHD economies. Dollarization has been a persistent characteristic of the Uruguayan economy for an extended period. A de-dollarization trend followed the 2002/2003 dollarization peak. That process lost momentum during the Global Financial Crisis. Since then, financial dollarization has stabilized.

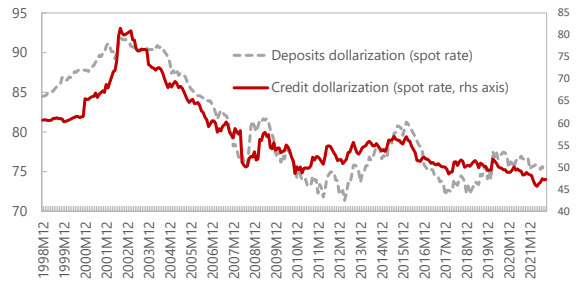
7. About 75 percent of total deposits in the banking system are in dollars, predominantly held by households. Households account for 72 percent of private sector foreign exchange deposits, while corporations account for the remaining 28 percent. In addition, price dollarization is prevalent in the economy, with the housing market and durable goods being primarily priced in dollars. The pricing of real estate, appliances, jewelry, livestock, and other high-value items displays a significant degree of dollarization (Landaberry and Mello, 2019.)

8. The extensive dollarization in Uruguay, at multiple levels, leads to financial stability risks. The high levels of public debt denominated in dollars and a considerable share of unhedged borrowers amplify the risks associated with dollarization. Approximately 50 percent of the central government's market debt is denominated in foreign currency, and more than 75 percent of corporate debt is in dollars. In addition, around 25 percent of FX loans are estimated to be unhedged

(given the lack of data on currency composition of firms' income, these are estimated as the ratio of FX loans granted to firms in the non-tradable sector).

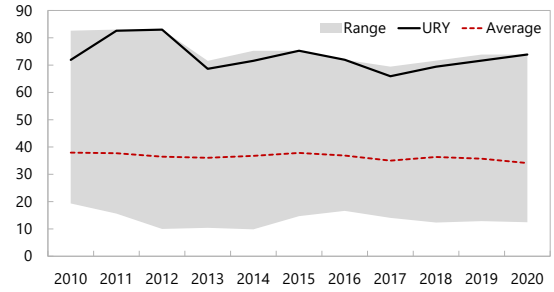
Figure 1. Uruguay: Dollarization Trends

Financial Dollarization (in percent)



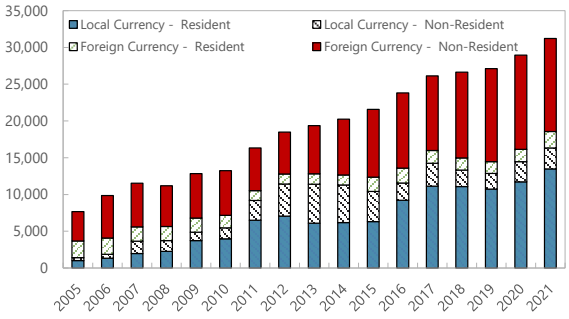
Source: BCU, IMF staff calculations

Regional Comparison of Dollarization (Share of FX liabilities to total liabilities, percent)



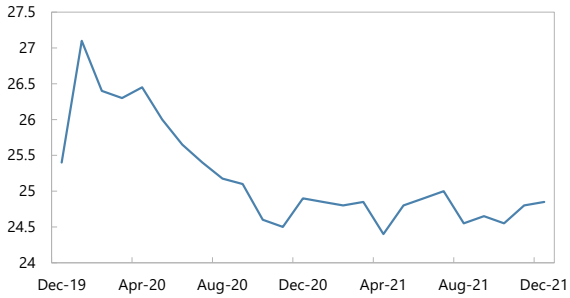
Source: Haver data and IMF staff calculations.
Average is the simple average of Bolivia, Paraguay, Peru, Costa Rica, Dominican Republic, Honduras, Guatemala, Chile and Argentina.

Domestic Treasury Notes and International Bonds by Currency and Residency



Source: National authorities and IMF staff calculations.

Implicit Foreign Exchange Risk



Source: Uruguayan authorities.
Measured as the ratio of FX loans granted to sectors with income in local currency to total loans.

Uruguay's Macroeconomic and Structural Characteristics

9. Uruguay has stable but high average inflation rate, and a history of significant fluctuations in its exchange rate relative to the US dollar. Even after the 2002/03 crisis, and despite implementing an inflation targeting regime since 2005, Uruguay's inflation rate has consistently remained elevated, with an average inflation of about 8 percent. Additionally, Uruguay's exchange rate depreciation volatility is among the highest among other Latin American dollarized economies.

10. Uruguay has relatively high GDP per capita in the region, and minimal restrictions on its external financial account, but its trade openness is relatively low, and there is ample room to continue enhancing its financial development. The country outperforms all other dollarized economies in the region in terms of economic development and governance indicators. Uruguay also has a low level of restrictiveness on its financial account, as indicated by the IMF's Financial Account Restrictiveness Index (FARI). Financial openness and rapid growth have not been accompanied by higher trade or financial development. Uruguay's trade openness is among the lowest in the region, and its financial development is relatively low, and similar to that of less developed countries (see Panel A1 in the Annex).

Table 1. Uruguay: Average CPI Inflation and ER Volatility: 2005-2022

	CPI Inflation	Inflation Volatility 1/		ER Volatility 1/	
	(Percent, yoy)	12-month	3-month	12-month	3-month
Bolivia	4.6	1.3	0.6	0.3	0.1
Chile	3.8	1.0	0.5	4.9	2.5
Costa Rica	5.5	1.1	0.6	2.3	1.0
Dominican Republic	4.8	2.5	1.0	3.2	1.0
Guatemala	5.0	1.2	0.6	1.0	0.5
Honduras	5.7	0.9	0.4	0.8	0.3
Nicaragua	7.1	1.6	0.7	2.1	0.7
Paraguay	5.3	1.5	0.9	3.1	1.5
Peru	3.2	0.7	0.3	2.3	1.0
Uruguay	7.8	0.8	0.4	4.8	2.2

Source: IMF International Financial Statistics.
1/ Volatility is measured as the rolling standard deviation for the specified time window.

Dollarization, Inflation and Exchange Rate Fluctuations

11. Inflation and exchange rates are two main drivers of dollarization. One widely accepted theoretical model to identify the drivers of dollarization is the Minimum Variance Portfolio (MVP) model (Ize and Levy-Yeyati, 2003). Under certain assumptions, it proposes that dollarization increases with inflation volatility and decreases with the volatility of the real exchange rate depreciation.[5] According to staff' calculations, the MVP dollarization ratio explains only partially the observed dollarization levels in Uruguay (see Annex 1, Panel A2).

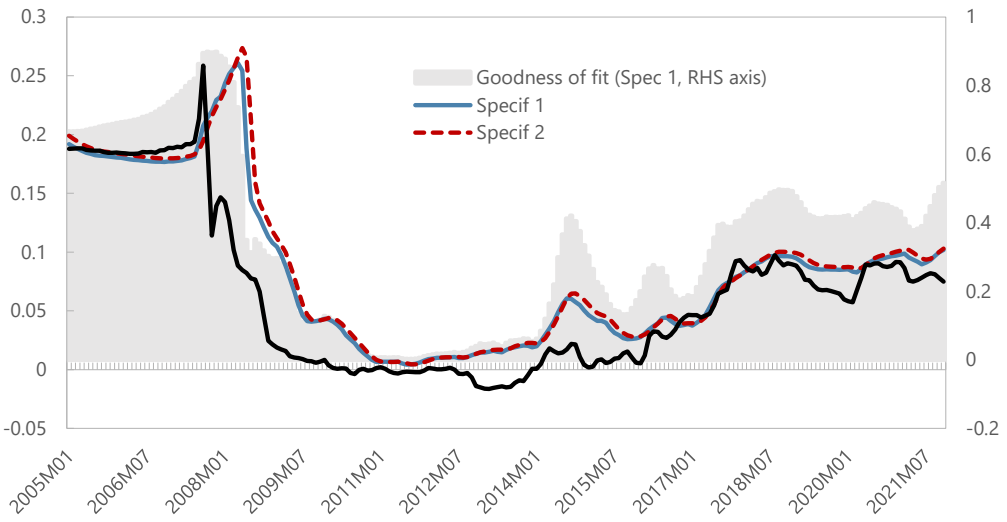
The Role of Interest Rates

12. The relationship between dollarization and interest rate differentials can be assessed from the dynamics of the uncovered interest rate parity (UIP) condition.[6] While the benchmark MVP model underscores the relevance of inflation and ER depreciation, it assumes, in its simplest version, that nominal interest rates are fixed. In a framework where interest rates can change, a positive UIP premium would favor de-dollarization, because it implies higher returns in local currency, while the opposite holds for periods of negative UIP premium, although compensation for risk also needs to be taken into account.

[5] It can be proved that the share of deposit dollarization implied by the MVP model is equivalent to the most standard measure of the pass-through from the nominal exchange rate and domestic prices. See more details of the MVP model and a proof of this equivalence in the Annex 2.

[6] UIP condition is defined as $E_t(S_{t+h})(1+i_t^{US}) = S_t(1+i_t)$ where i_t and i_t^{US} t are the local currency and the dollar (12-month deposit) interest rates, respectively. E denotes expectations over the next year, and h is a 12-month horizon. S is the exchange rate in units of local currency per USD.

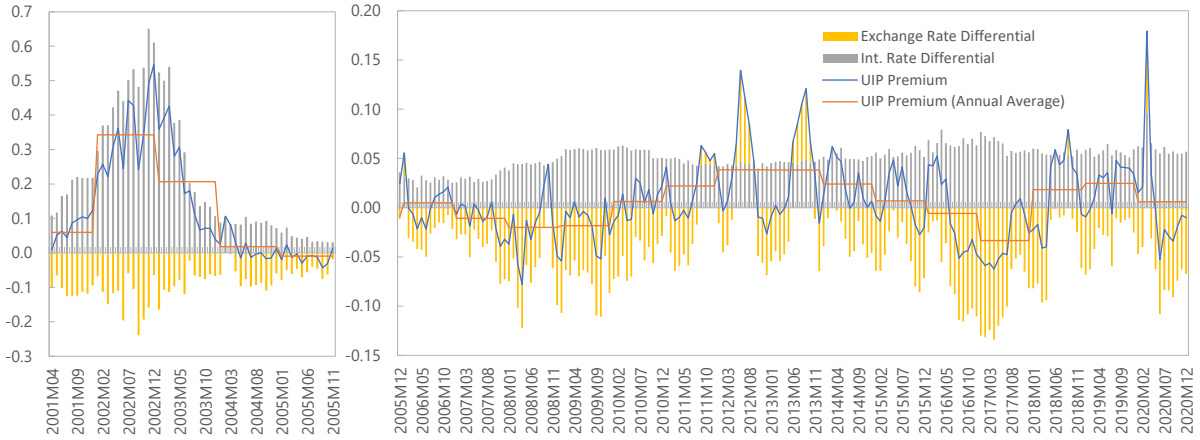
Figure 2. Uruguay: Pass-Through from ER to Domestic Prices



Source: IMF staff calculations.
Beta coefficients from regressions of: Spec. 1: the y-o-y inflation on the y-o-y depreciation of the ER; Specif. 2: the 3-month moving average of the y-o-y inflation on the 3 month moving average of the y-o-y depreciation of the ER; Spec. 3: the quarterly logartihmic difference in the price level on the quarterly logharitmic difference in the peso-dollar ER.
All calculated over a 5-year window using monthly data.
Reporting the R-squared coefficient from regressions of: the y-o-y inflation on the y-o-y depreciation of the ER.
All calculated over a 5-year window using monthly data.

13. In Uruguay, the volatility of the 12-month deposit UIP premium is primarily driven by changes in exchange rate expectations. Interest rate differentials were generally stable over the last two decades, making fluctuations in the exchange rate the main driver of UIP changes. Additionally, exchange rate expectations have consistently favored a depreciation of the local currency relative to the US dollar. Staff results found that, for 12-month deposits, the UIP condition holds (see details in Annex A3), which indicates no systematic compensation for risk on average.

Figure 3. Uruguay: Uncovered Interest Rate Parity Premium
(12-month Deposits, in logs)



Source: IMF staff calculations based on BCU and Consesus data.

14. The fluctuations of the UIP components can help explain financial dollarization. While the UIP condition holds in the long term, short-term fluctuations could contain information to explain dollarization. Empirical analysis supports the expected relationship between the UIP components and the degree of financial dollarization in the economy. Regression results indicate that the level of dollarization decreases as the interest rate differential between domestic currency and dollar deposits increases. Additionally, a higher spot exchange rate is associated with lower levels of dollarization, while expectations of a depreciating exchange rate tend to result in higher levels of dollarization (see Table 2).

Table 2. Uruguay: Financial Dollarization and Changes in the UIP Components

Cointegrating Equation (VEC model)	
Log of Share of Deposit Dollarization	1.00
Deposit Interest Rate Differential (i-i*)	0.047***
	(0.00656)
Log of ER (eop)	1.94***
	(0.78075)
Log of ER 12-month expectations	-1.74***
	(0.72554)
Error Correction Term	-0.0023

Standard errors in ( )
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculations. Results from a VEC model using monthly data between 2003-2020. Johansen cointegration test results indicate the existence of a cointegrating vector.

Reserve Requirement Differential as Prudential Tool

15. Macroprudential policies such as marginal reserve requirement for foreign currency deposits can help reduce dollarization. Raising the cost of holding dollar-denominated deposits relative to local currency deposits for local banks is a strategy that policymakers have often pursued to discourage deposit dollarization. A useful tool consists in differentiating the reserve requirement for dollar and local currency deposits, specifically by raising the reserve requirement of dollar-denominated deposits above the one for local currency deposits. This imposes an additional cost to banks of holding dollar deposits. Among countries with a high degree of deposit dollarization in Latin America, Peru is a successful example of a country that has used this tool as a measure to encourage the de-dollarization of banking deposits. The combination of marginal reserve requirement, together with the introduction of additional prudential measures, such as higher provisions for foreign currency loans, have helped reduce financial dollarization in Peru (Catão and Terrones, 2016; and García-Escribano and Sosa, 2011). In contrast, Uruguay has had a relatively low level of marginal reserve requirement for foreign currency deposits, only reaching comparable levels in the last year (See Figure 4).

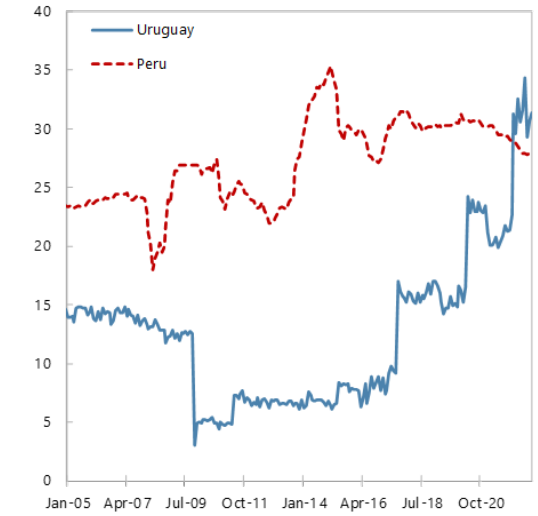
C. The Determinants of Dollarization

Drivers of Dollarization in the Region

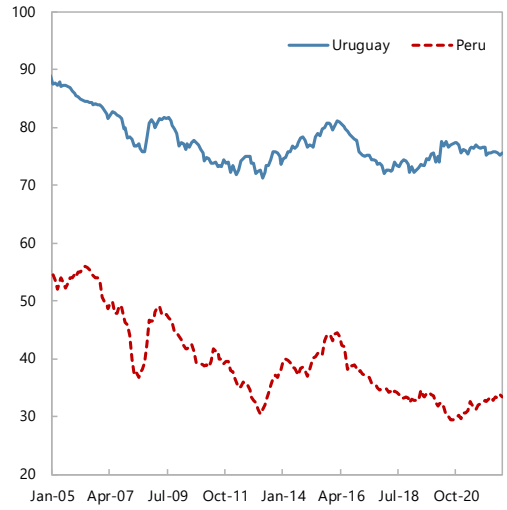
16. Deposit dollarization can be influenced by macroeconomic and structural country characteristics other than inflation, depreciation and interest rate differentials. Adopting the methodology from Della Valle et al. (2018) and IMF (2021), a regression analysis was conducted to examine the drivers of deposit dollarization in a selected group of economies in the region.

Figure 4. Uruguay: Marginal Reserve Requirement and Deposit Dollarization

Marginal Revenue Requirement for FC Deposits (percent)



Deposit Dollarization (percent of total deposits in FC)



Source: Country authorities and IMF staff Calculations.

17. The baseline regression analysis is based on annual data between 1999 and 2019 and employs a panel regression approach to explain financial dollarization. The sample comprises 10 countries in the region: Bolivia, Chile, Costa Rica, Dominican Republic, Guatemala, Honduras, Nicaragua, Paraguay, Peru, and Uruguay. The selected determinants of dollarization are aligned with the existing literature on exchange rate arrangements and included variables such as economic size (measured by population and real GDP per capita), trade openness (as a percentage of GDP), capital account openness (proxied by the IMF's Financial Account Restrictiveness Index (FARI), remittances, and governance indicators.[7] The regression model also incorporates variables related to monetary and external position performance, such as the MVP estimates, exchange rate, and inflation.

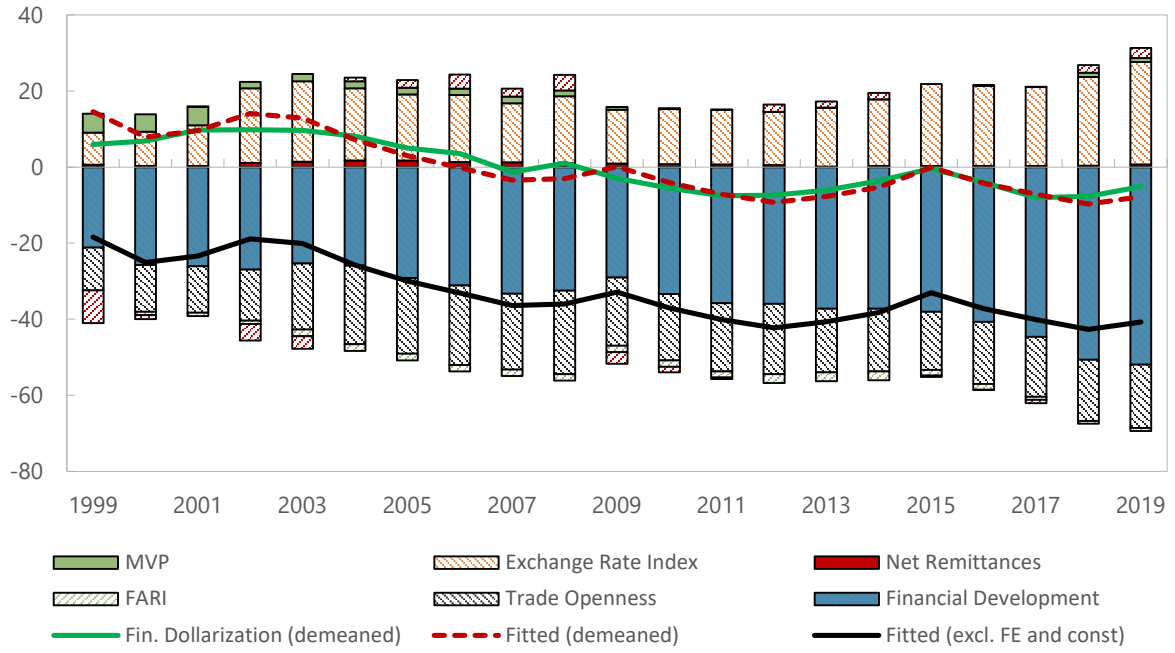
18. In the preferred panel data estimates, most macroeconomic determinants are statistically significant and have the expected sign. The analysis reveals statistically significant and positive correlations between dollarization, the exchange rate, and the MVP term (Table 3, Column 1). The latter accounts for the relative impact of exchange rate and inflation variance, as well as their covariance. Higher levels of net remittances, which are often received in US dollars increase the availability of foreign currency (FX) in the economy, thereby boosting the size of FX deposits and exacerbating cultural and price dollarization. The effect of the exchange rate on dollarization is not surprising, as a continued depreciation of the local currency incentivizes to hold FX as a store of value. Finally, the positive relationship between the MVP variable and dollarization supports the MVP model's theoretical framework.

[7] Based on the capital controls reported in the Annual Report on Exchange Rate Arrangements and Exchange Restrictions.

19. The model also indicates an inverse relationship between dollarization and financial development, financial account restrictiveness, and trade openness. Higher financial development, as reflected by the financial development index, may lower the incentives to hold foreign currency deposits, given the increased opportunities to hedge currency risks and invest in local currency securities, and lower incentives for keeping dollars for precautionary reasons. Conversely, a negative relationship between dollarization and financial account restrictiveness may be driven by reduced access to FX resources, which could reduce the availability of FX deposits and loans.[8] The negative relationship between trade openness and dollarization contradicts previous evidence from Della Valle et al. (2018), which found a positive coefficient for a broader set of countries. However, the effect of this variable may depend on its underlying main driver, as exports increases might have the opposite effect to imports increases.

20. When examining the impact of the explanatory variables on dollarization levels in Uruguay, the results show that exchange rate, financial development, and trade openness have the most significant contributions. The contribution of each variable to the model's predicted fitted value was estimated, after adjusting for the constant and fixed-effect terms. Continued exchange rate flexibility would contribute to the de-dollarization strategy as exchange rate appreciations are associated to lower dollarization levels. Also, the continued improvement of financial development has helped reduce financial dollarization. The analysis also highlights the sensitivity of dollarization levels to variations in trade openness. Variables such as FARI and net remittances had less of an impact in this case due to their low Uruguay-specific variance.

Figure 5. Uruguay: Contributions to the Fitted Values – Panel Data Regression



Source: Authors' calculations.

[8] The Financial Development index is published by the IMF. It is a relative ranking of countries on the depth, access and efficiency of their financial institutions and financial markets.

Uruguay's Country-Specific Dollarization Drivers and The Role of Prudential and Monetary Policies

21. Country-specific regressions for Uruguay confirmed the previous findings. There were two potential factors that could affect the robustness of the previous results: first, the panel data regression may have captured the dynamics of economies other than Uruguay more strongly, as the estimated coefficients are a weighted average of the information observed in each country. Second due to data availability, the panel data specifications use annual frequency data and did not include

Table 3. Uruguay: Drivers of Dollarization

Share of Deposits in FX	(1)	(2) a/	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) e/
	Panel Data FE b/	Panel Data FE b/	Panel Data FE b/	Panel Data FE b/	Panel Data FE b/	Panel Data FE b/	Time Series OLS	Time Series VEC c/	Time Series DOLS d/	Time Series DOLS d/
FD: Financial development index	-1.70**	-1.65**	-1.84**	-1.84**	-1.79**	-1.83**	-1.13***	-1.04***		
	(0.61)	(0.60)	(0.64)	(0.61)	(0.63)	(0.60)	(0.12)	(0.20)		
Trade Openness (perc. of GDP)	-0.33**	-0.38**	-0.31**	-0.31**	-0.31**	-0.31**	-0.34***	-0.13		
	(0.11)	(0.14)	(0.12)	(0.12)	(0.12)	(0.12)	(0.06)	(0.13)		
Financial Account Restrictiveness	-0.43**	-0.49**	-0.50**	-0.50**	-0.48**	-0.50**	-0.49	-0.28		
	(0.17)	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.32)	(0.55)		
Net Remittances (perc.of GDP)	2.31*	1.85*	2.31*	2.32*	2.30*	2.32*	9.26***	11.70**		
	(1.05)	(0.83)	(1.08)	(1.08)	(1.07)	(1.08)	(2.82)	(4.34)		
Log of Exchange Rate Index (eop, 2005=100)	16.72**	13.03*	14.49**	14.57**	15.01**	14.91**	11.33***	27.73***	10.20***	4.68*
	(5.77)	(6.03)	(5.01)	(5.42)	(5.09)	(5.55)	(2.24)	(2.96)	(0.88)	(2.43)
Variance of Inflation			-0.02	-0.02*						
			(0.04)	(0.01)						
Variance of Deprec. Real ER			0.00		-0.00					
			(0.00)		(0.00)					
Covariance Inflation-Deprec. Real ER			-0.00			-0.01*				
			(0.01)			(0.00)				
MVP (from monthly data)	0.13**	0.09								
	(0.05)	(0.05)								
FX Deposits Interest Rates							1.39***	3.19***		
							(0.43)	(0.87)		
LCU Deposits Interest Rates							-0.05**	-0.20**		
							(0.02)	(0.08)		
Lending interest rate spread (i-i*)										1.62***
										(0.05)
Deposit interest rate spread (i-i*)									-2.41***	
									(0.07)	
Reserve Requirement Differential (USD dep. req. minus peso dep. req.)								-0.81***	-0.75***	-0.52***
								(0.13)	(0.03)	(0.10)
Monetary Policy Rate as instrument (Dummy)									-0.50*	-3.47***
									(0.29)	(0.35)
Uruguay CPI inflation									3.51***	1.94***
									(0.09)	(0.27)
US CPI inflation									-0.61***	5.30***
									(0.12)	(0.31)
VIX									5.96***	-12.56***
									(0.34)	(0.87)
US Treasury Yield: 3-month									2.37***	
									(0.14)	
US Treasury Yield: 12-month										0.25
										(0.26)
Observations	197	187	197	197	197	197	240	208	216	216
R-squared	0.65	0.63	0.63	0.63	0.63	0.63	0.94			
Frequency	Annual	Annual	Annual	Annual	Annual	Annual	Monthly	Monthly	Monthly	Monthly
Number of countries	10	10	10	10	10	10	1	1	1	1

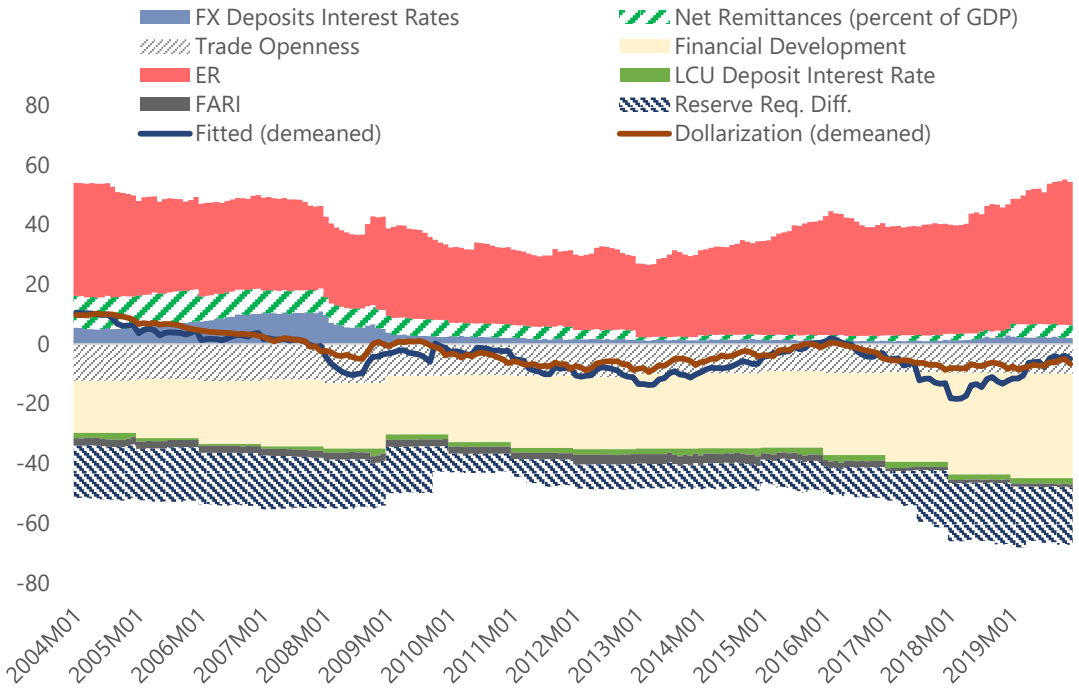
Source: Authors' calculations based on IMF and WB data.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
a/ Instead of contemporaneous regressors, this specification includes lagged RHS explanatory variables as a simple way to control for endogeneity.
b/ FE stands for Fixed Effect model.
c/ VEC reports the cointegrating equation from a Vector Error Correction Model.
d/ DOLS reports the cointegrating equation from a Dynamic OLS model estimation.
e/ This model has credit dollarization as the dependent variable.

interest rate series nor proxies for prudential policies, because of missing observations for other economies. To address these issues, an additional set of country-specific results using monthly data and incorporating interest rates of deposits in both local currency and FX as potential explanatory variables is reported. The analysis also includes a newly built variable to capture the effect of currency-differentiated deposit reserve requirements (Columns 7-8 of Table 3). The signs of the coefficients remain unchanged, although the magnitude and significance of some variables is affected. In addition to the three main drivers of dollarization mentioned above (¶19), there is an important contribution from two more variables, the fluctuations of net remittances and the reserve requirement differential. While statistically significant and with the expected sign, interest rates of peso and dollar deposits do not drive the results in a quantitatively important way, very likely due to their low volatility over the years.

22. The country-specific regression results also suggest that the role of prudential measures could be significant. The margin between reserve requirements for dollar and peso deposits affect financial dollarization levels. A one percent increase in the differential between reserves requirements in dollars and pesos would contribute to reduce financial dollarization levels by around 0.8 percentage points.

23. The impact of prudential and monetary policies on the level of financial dollarization in the Uruguayan economy is also relevant using higher frequency data. In order to understand the drivers of dollarization at higher frequency, a model with monthly data is also estimated (i.e. excluding structural variables). Following Catão and Terrones (2016) a set of external and domestic variables affecting dollarization were identified. The model including high frequency

Figure 6. Uruguay: Contributions to the Fitted Values – Uruguay's Country-Specific Regression



Source: Authors' calculations based on coefficients in Table 3, Column 8.

monetary/financial external and domestic variables is based on monthly data from 2006 until 2021 and utilizes a time series regression for a set of domestic factors, which include some macro-prudential policies, and external factors. Domestic factors include the introduction of monetary policy rate as instrument, reserve requirement differential, exchange rate and domestic inflation. External factors are aligned with previous literature and consist of foreign interest rates (as represented by the interest rate spread between dollar and peso), volatility in global financial centers (as represented by the VIX index), and US inflation.

24. Regression results using high-frequency data confirm the role of marginal reserve requirements, as well as the role of monetary policy and inflation (Column 9 in Table 3). The empirical results suggest that a one percentage increase in the reserve requirement differential between dollar and peso deposits decreases deposit dollarization 0.75 percentage points. Additionally, the results suggest that the implementation of inflation targeting with a short-term rate policy instrument between 2007 and 2013, and again since late 2020 has contributed to reducing financial dollarization. Furthermore, higher domestic inflation would be associated with higher dollarization levels: a reduction of inflation of 1 percentage point would lower dollarization by about 3.5 percentage points. Those results further reinforce the importance of monetary policy credibility and delivering low and stable inflation in supporting financial de-dollarization.

25. External factors can also explain de-dollarization trends at a high frequency. Higher interest rate spreads between peso and dollar deposits make holding deposits in pesos more attractive and reduce dollarization. Conversely, higher US interest rates also increase dollarization as it makes deposits in US dollars more attractive. Lower US inflation increases dollarization although the effect is quantitatively small. Increased global financial market volatility encourages deposit dollarization, suggesting that a flight-to-safety effect remains significant in Uruguay whenever risk-off events occur in global financial markets.

26. Most of the previous findings hold when the determinants of credit dollarization are analyzed. Importantly, the role of monetary policy and prudential policies is consistent (Table 3, Column 10). However, as expected, some variables exhibit the opposite signs, since the determinants of savings (deposits) and borrowing (credit) would be expected to operate in different ways. In particular, financial global volatility and interest rate differential variables capture well that credit dollarization would decline in scenarios of financial stress, and the positive (negative) effect of local currency (FX currency) interest rates on FX credit demand.[9]

D. Policy Recommendations

27. The phenomenon of dollarization can be attributed to a convergence of structural elements, macroeconomic conditions, and prudential regulations. Staff analysis suggests that structural factors and macroeconomic indicators, such as exchange rate volatility and the level of financial development, have a greater impact on the degree of dollarization. Also, the results support that a comprehensive de-dollarization strategy should incorporate policy tools aimed at improving

[9] See Annex A.4 for robustness analysis after controlling for the exchange rate valuation effect on the dollarization ratio.

the monetary policy framework, lowering inflation in a sustained manner, and adjusting prudential regulations. This strategy should be designed to address the interplay of the contributing factors and work towards the common goal of reducing dollarization in the country.

28. Re-calibrating prudential policies and strengthening the monetary policy framework would also contribute to de-dollarize the economy. An increase of one percentage point in the reserve requirement differential between local currency and US dollar deposits could result in a reduction of approximately 0.8 p.p. in the share of FX deposits and 0.5 p.p in the share of FX credit. Furthermore, there is evidence supporting a positive impact from the use of the short-term interest rate as the monetary policy instrument.

29. A comprehensive approach to de-dollarization requires coordination between long-term and short-term policies. A de-dollarization plan should encompass policies aimed at improving structural factors, maintaining macroeconomic stability, and enhancing economic conditions, such as sustained exchange rate flexibility, especially in periods of exchange rate appreciation. A strengthened monetary policy framework and the implementation of prudential policies, such as the analyzed currency-differentiated reserve requirement, are also crucial to the success of a de-dollarization plan.

30. The examination of the impact of additional prudential regulation instruments is yet to be undertaken. The substantial influence of financial account restrictions on the degree of dollarization in other dollarized economies highlights the sensitivity of financial dollarization to prudential regulation. Further analysis regarding the effects of other prudential measures on the extent of price dollarization is beyond the scope of this paper. Nonetheless, prudential regulation designed to reduce the system's exposure to borrowers who have not hedged their risk or safeguard FX deposits should be aimed at achieving a common objective.

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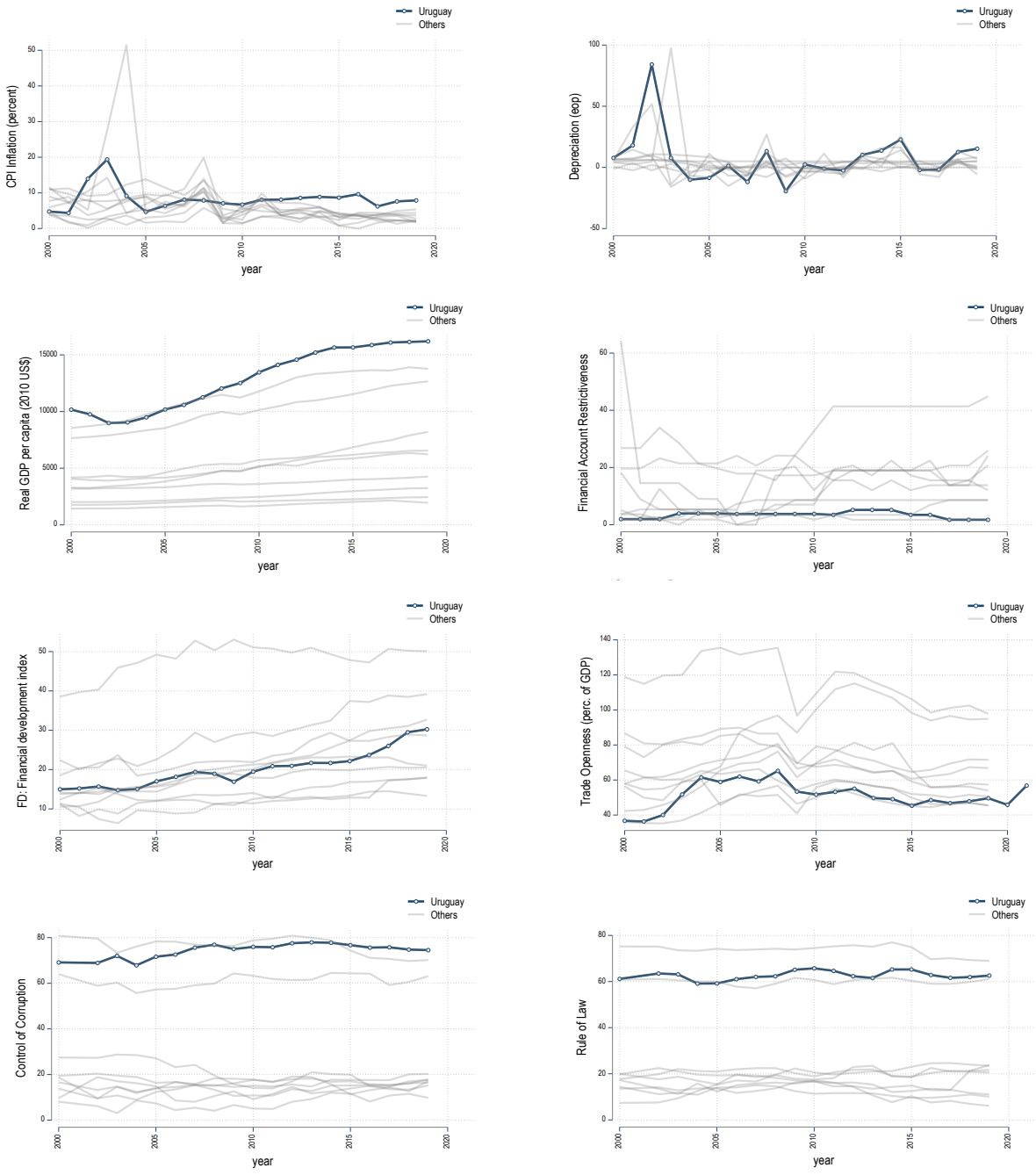
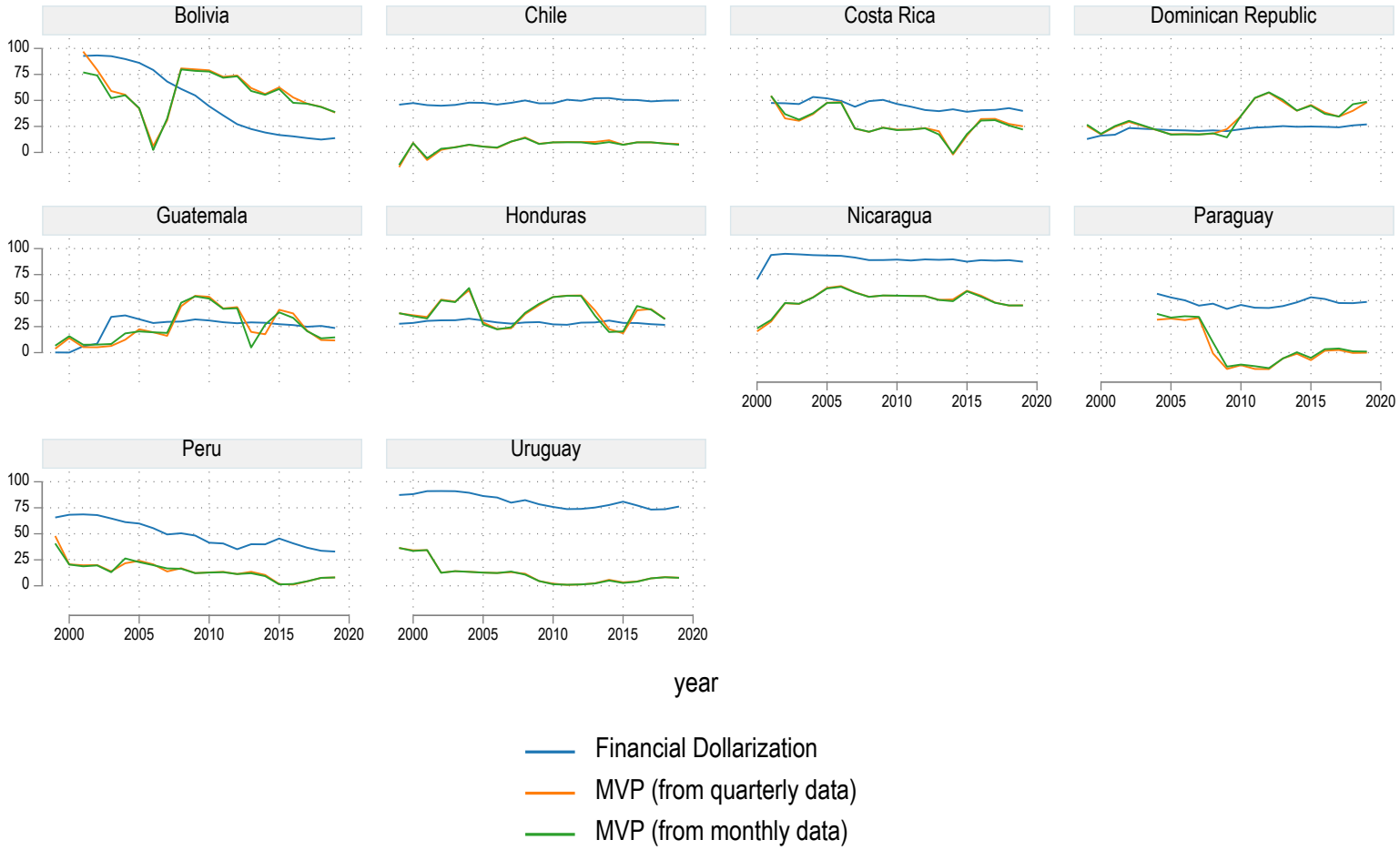
Annex I. Selected Charts and Tables

Figure 1. Uruguay's vs. Other Dollarized Countries – Select Economic Indicators



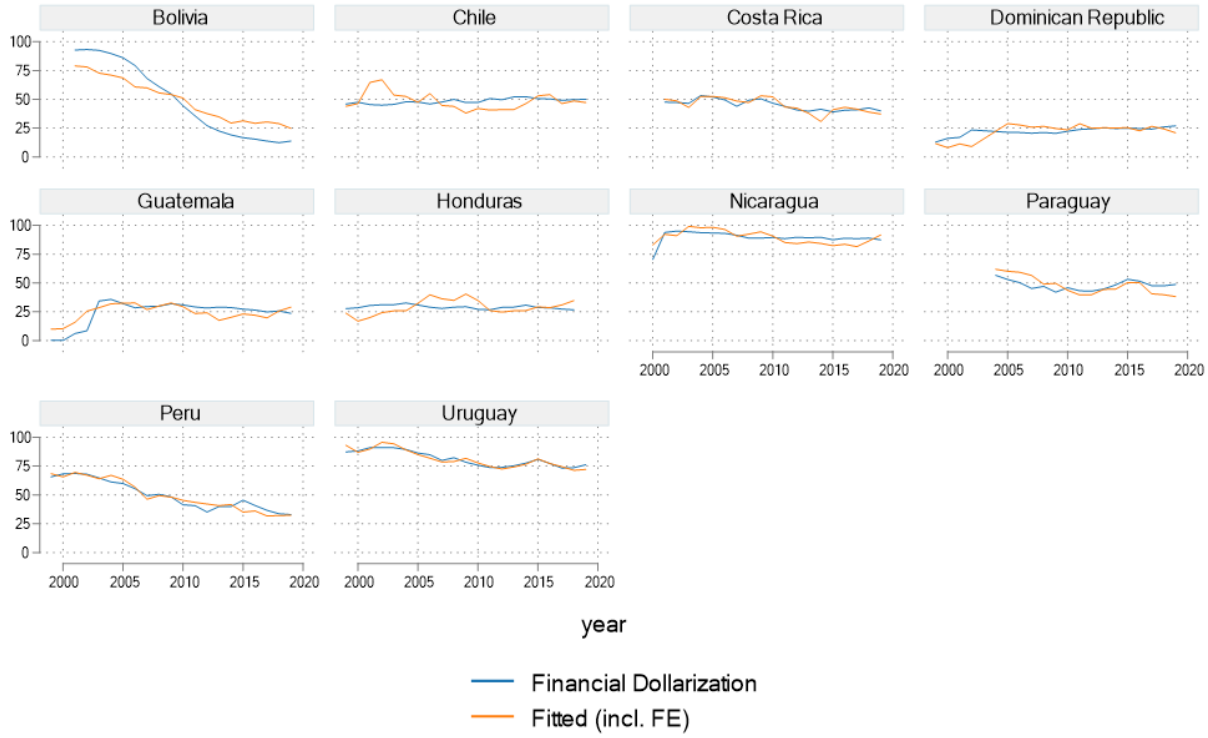
Source: IMF staff calculations based on IMF and WB data.

Figure 2. Uruguay: Financial Dollarization and the MVP Model



Source: Authors' calculations.

Figure 3. Uruguay: Actual and Fitted Values of the Panel Data Specification (Table 3, Column 1)



Source: Authors' calculations.

Table 1. Uruguay: Minimum Reserve Requirements for Banks on Deposits in Local Currency

	Demand Deposits	Term Deposits (30-90 days)	Term Deposits (91-180 days)	Term Deposits (181-364 days)
August 2002	30%	24%	24%	22%
November 2002	30%	24%	24%	5%
April 2003	27.5%	21.5%	21.5%	5%
June 2003	22.5%	16.5%	16.5%	5%
July 2003	20%	14%	14%	5%
August 2003	17.5%	11.5%	11.5%	5%
October 2003	17%	9%	6%	4%
March 2007	17%	9%	6%	4%
November 2007	17%	9%	6%	4%
December 2009	12%	9%	6%	4%
May 2011	15%	9%	6%	4%
August 2013	15%	9%	6%	4%
May 2015	23%	14%	9%	6%
March 2016	28%	14%	9%	6%
August 2017	22%	11%	7%	5%
April 2020	15%	6%	2%	2%
Jan 2021	22%	11%	7%	5%
Jan 2022	15%	3%	2%	1%

Source: BCU, Libro XIV, Régimen de Encajes and Circulares Instituciones Financieras.

Table 2. Uruguay: Minimum Reserve Requirements for Banks on Deposits in Foreign Currency

	Demand Deposits and Term Deposits (up to 180 days)	Term Deposits (more than 180 days)
August 2002	10%	4%
July 2003	10%	4%
September 2003	25%	19%
March 2007	25%	19%
November 2009	15%	9%
May 2011	18%	14%
August 2013	18%	14%
May 2015	26%	20%
March 2016	28%	20%

Source: BCU, Libro XIV, Régimen de Encajes and Circulares Instituciones Financieras.

Annex II. The MVP Model

In this model, currency choice is determined by hedging decisions on both sides of a bank's balance sheet. Domestic depositors' portfolios comprise three assets: domestically held home currency deposits (HCD), domestically held foreign currency deposits (FCD) and cross-border foreign currency deposits (CBD), with real returns in terms of the domestic price index. Due to foreign exchange rate risk, dollar deposits (at home or abroad) are imperfect substitutes for home currency deposits. In addition, deposits held locally are imperfect substitutes for deposits held abroad.

1. The MVP estimate for the levels of dollarization, in its simplest version depends on ER depreciation and inflation volatilities only. The share of deposits in dollars predicted by the MVP is defined in the following terms:

$$\lambda^* = \frac{\sigma^2_{\pi,\pi} + \sigma^2_{\pi,s}}{\sigma^2_{\pi,\pi} + \sigma^2_{s,s} + 2\sigma^2_{\pi,s}}$$

2. Where $\sigma^2_{\pi,\pi}$ is the variance of inflation, $\sigma^2_{\pi,s}$ is the covariance between inflation and real exchange rate depreciation, and $\sigma^2_{s,s}$ is the variance of real exchange rate depreciation. The dollarization level implied by the MVP model is equivalent to the coefficient of the pass-through from nominal exchange rate to inflation.

3. Proof of the equivalence between the MVP and the pass-through coefficient To formally prove this, define the identity $S = E/P$, where S is the real exchange rate, E is the nominal exchange rate (local currency per dollar), and P is the level of domestic prices. Correspondingly, the ER identity could be expressed in percentage change as approximately[1] $s = e - \pi$, where s is the real depreciation rate, e is the nominal depreciation rate, and π is inflation. The most common measure of the pass-through is equal to the coefficient β from the specification below:

$$\pi = \alpha + \beta \cdot e + \varepsilon$$

$\hat{\beta}$ correspond to the estimate of β, which is calculated in terms of the variance of the nominal ER and the covariance between ER and inflation. As shown below, that definition is equivalent to the definition of the MVP estimate.

$$Pass - through = \hat{\beta} = \frac{\sigma^2_{\pi,e}}{\sigma^2_{e,e}} = \frac{\sigma^2_{\pi,(s+\pi)}}{\sigma^2_{(s+\pi),(s+\pi)}} = \frac{\sigma^2_{s,\pi} + \sigma^2_{\pi,\pi}}{\sigma^2_{s,s} + \sigma^2_{\pi,\pi} + 2\sigma^2_{\pi,s}} = \lambda^*$$

[1] This approximation assumes that the term $(s \cdot \pi)$ is small.

Annex III. UIP Premium

1. Denoting logs with lower case letters, the UIP condition can be re-expressed as:

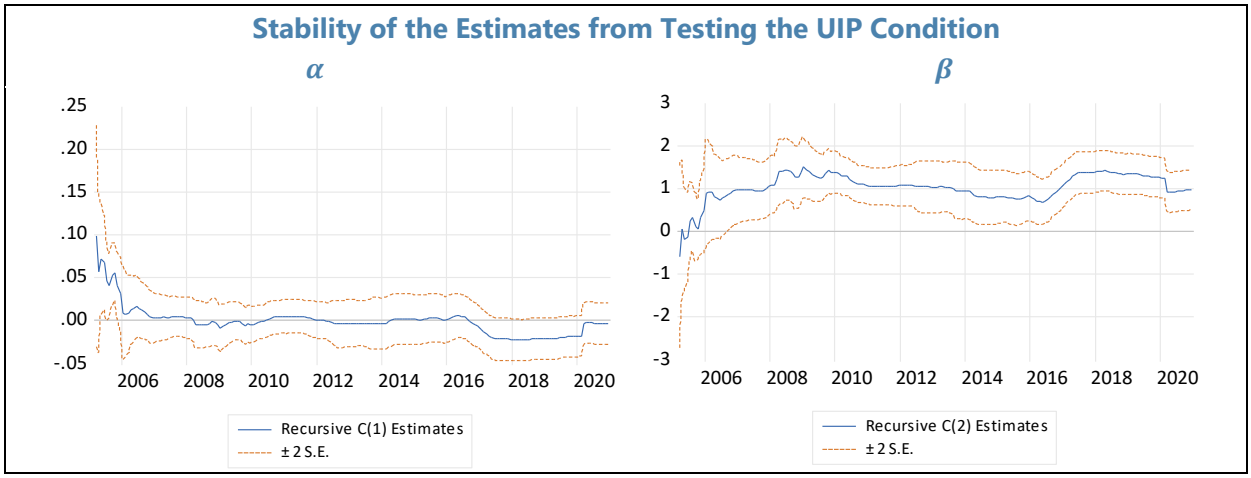
$$\delta_{t+h} = \left(\widetilde{\imath_t} - \widetilde{\imath_t^{US}}\right) + \widetilde{s_t} - \widetilde{s_{t+h}^e}$$

Where $\widetilde{\imath_t} = log(1 + i_t)$, $\widetilde{\imath_t^{US}} = log(1 + i_t^{US})$, $\widetilde{s_t} = \log(S_t)$ *and* $\widetilde{s_{t+h}^e} = log\left(E_t(S_{t+h})\right)$. A value of $\delta = 0$ would indicate that the UIP holds at all times.

2. Over the long term, and isolating periods of large volatility such as the 2002 crisis, the UIP condition holds. The UIP premium has been zero on average over the last twenty years. In addition, the UIP premium does not show a consistently positive or negative bias. It is possible to check if the UIP condition holds estimating the below specification:

$$\widetilde{s_{t+1}^e} - \widetilde{s_t} = \alpha + \beta\left(\widetilde{\imath_t} - \widetilde{\imath_t^{US}}\right) + u$$

and testing the two null hypotheses that $\alpha = 0$, and $\beta = 1$. For Uruguay, the null hypotheses cannot be rejected at standard confidence intervals.



Annex IV. Robustness Analysis

1. Measures of financial dollarization could be distorted by a valuation effect from fluctuations in the exchange rate. Large exchange rate movements can affect the estimated dollarization ratio of deposits and credit even when demand for either currency in the banking system has not changed. This annex presents a series of robustness exercises to check whether the effect and significance of prudential policies holds when controlling for the valuation effect in the definition of financial dollarization. Two alternative measures that control for valuation effects are used: first, the deposits and credit dollarization ratio measured at a constant exchange rate (see Mwase and Kumah, 2015), and second, the level of deposits and loans in US dollars to see if there is a decline in absolute terms.

2. Results for prudential and monetary policies broadly hold for the measures of the dollarization ratio adjusted for valuation effects and for dollarization measured in absolute terms. The effect of reserve requirement differential increases marginally for deposits, while for credit the effect is four times larger for the level of dollar-denominated loans. Although for the credit dollarization ratio the effect of reserve requirements is not statistically significant, the coefficient remains negative. Monetary policy credibility remains an important factor as well, with results showing higher levels of domestic inflation being associated with higher levels of financial dollarization, and the introduction of a policy rate as instrument associated with significantly lower levels of dollarization in deposits and credit.[1]

Table 1. Uruguay: Robustness Checks

VARIABLES	(1) Deposit Dollarization at Constant ER a/	(2) Log of Deposits in FC a/	(3) Credit Dollarization at Constant ER a/	(4) Log of Credit in FC a/
Log of Exchange Rate (pa)	-7.37***	0.27***	-5.78***	-0.19***
	(1.13)	(0.07)	(0.40)	(0.04)
Reserve Requirement Differential (USD dep. req. minus UYU dep. req.)	-0.98***	-0.01***	-0.02	-0.02***
	(0.04)	(0.00)	(0.02)	(0.00)
Deposit interest rate spread (i-i*)	-2.72***	0.02**		
	(0.08)	(0.01)		
Lending interest rate spread (i-i*)			0.36***	0.01***
			(0.01)	(0.00)
Monetary Policy Rate as instrument (Dummy)	-0.46	-0.10***	-0.61***	-0.07***
	(0.35)	(0.01)	(0.10)	(0.01)
Uruguay CPI inflation	4.27***	-0.03*	0.12***	0.11***
	(0.10)	(0.01)	(0.05)	(0.00)
US CPI inflation	-0.54***	-0.00	1.27***	-0.00
	(0.15)	(0.01)	(0.06)	(0.01)
VIX	7.15***	-0.21***	-2.64***	-0.06***
	(0.47)	(0.04)	(0.17)	(0.02)
US Treasury Yield: 3-month	2.88***	-0.12***		
	(0.20)	(0.01)		
US Treasury Yield: 12-month			-0.28***	-0.03***
			(0.06)	(0.01)
Observations	216	216	216	216
Frequency	Monthly	Monthly	Monthly	Monthly

Source: Authors' calculations based on IMF and Uruguayan authorities' data.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
a/ DOLS reports the cointegrating equation from a Dynamic OLS model estimation.

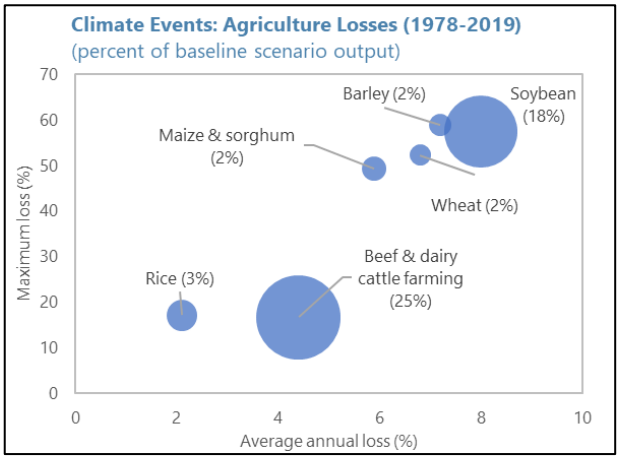
[1] This exercise should be interpreted with caution as adjusting the dollarization ratio for exchange rate valuation effects may alter the sign of the estimated coefficient in a regression of exchange rate on dollarization. This can result in an inaccurate conclusion of the direction of the effect. It can be shown that one special case where this could happen is when the true (unobserved) relationship between the exchange rate and dollarization ratio is non-linear.

EMBRACING CLIMATE CHANGE CHALLENGES[1]

Uruguay has been at the forefront of the design of economic policies to address climate change, achieving in the last decades a substantial reduction in its greenhouse gas emissions intensity without endangering its economic development. Climate-smart practices for its agricultural sector have allowed the country to address food security, human health, competitiveness in external markets as well as environmental sustainability. Having already achieved the greening of its electricity generation, a further decarbonization of the economy could rely on envisaged electric mobility initiatives as well as on green hydrogen prospects. As Uruguay's exposure to extreme climate events has been increasing, current adaption efforts would need to be intensified to advance a climate-resilient economy. Drawing on multilateral development banks' innovative financing instruments to support environmental outcomes could help mobilizing budgetary resources and scaling up private climate finance.

A. Background and Recent Developments

1. Uruguay is a low producer of global greenhouse gas (GHG) emissions but is vulnerable to climate change. Because of its small size and the relatively low level of industrialization, the contribution of Uruguay to the generation of global warming represents only 0.03 percent of the global anthropogenic GHG emissions.[2] However, Uruguay's economy is primarily based on the use of natural resources, exposing its agro-industrial and tourism sectors to the effects of climate change and climate variability. Over the last decades, climate events (mainly floods and droughts) have impacted crop yields and cattle farming productivity, materializing in output losses, with spillovers to the rest of the economy. Floods and droughts are becoming more frequent and intense, while 70 percent of the population lives in coastal areas exposed to rising sea levels. [3]



Source: NAP Agriculture; MGAP; IMF staff calculations.
Note: size of the bubble represents the share in agriculture output, also included in labels.

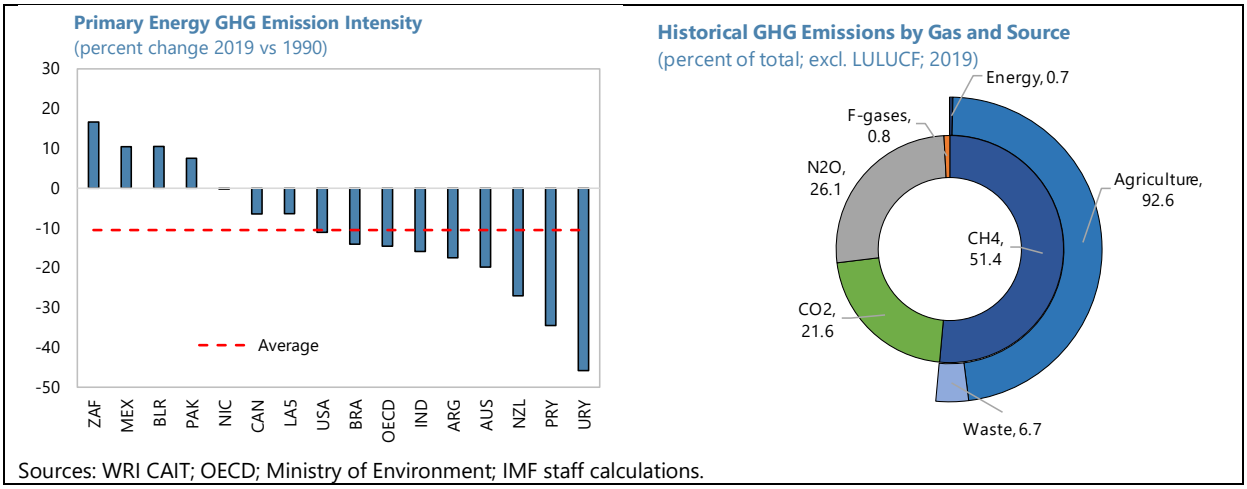
2. Uruguay has achieved a substantial reduction in its GHG emissions intensity without endangering its food security and economic development. During the 1990-2019 period, net emissions increased by 8.6 percent, but the economy more than doubled its size, thereby cutting by almost half its emissions intensity. This result, which stands out from Uruguay's main

[1] Prepared by Jean Francois Clevy Aguilar (WHD). This SIP benefitted from valuable comments and suggestions from colleagues in the SPR department of the IMF, and authorities from the Ministry of Economy and Finance, the Ministry of Environment and the Ministry of Livestock, Agriculture and Fisheries during the Article IV consultation mission.

[2] Based on Uruguay's 2019 inventory of greenhouse gas emissions (INGEI 2019).

[3] Uruguay's Second Nationally Determined Contributions.

export competitors, has been underpinned by a gradual decarbonization of its energy supply, as renewable sources account currently for almost 60 percent of the total supply.[4] According to Uruguay's latest *National Greenhouse Gas Inventory*, total GHG emissions reached 31 million metric tons of CO_2 equivalent ($MtCO_2e$), comprised mainly of methane (51% of the total), nitrous oxide (26%) and carbon dioxide (22%) in 2019. Biogenic methane emissions generated by agricultural activities accounted for almost 93 percent of total methane emissions. Land Use, Land Use Change and Forestry (LULUCF) in Uruguay operates as a carbon sink rather than a contributor, absorbing in net terms 11.5 $MtCO_2$ (29.6 MtCo2 emitted and 41.0 $MtCO_2$ absorbed). Taking into account LULUCF contributions, net emissions hovered around 19 $MtCO_2e$.



Sources: WRI CAIT; OECD; Ministry of Environment; IMF staff calculations.

3. Uruguay is at the forefront of the design of economic policies to address climate change. Balancing economic development with transforming the economy into a more climate-resilient, green, and sustainable one has become a national priority. The country's strong political commitment to integrate climate change into the different areas of public policy has contributed to the necessary institutional, regulatory and management framework for environmental governance and the protection of natural resources. Framed on its *National Policy on Climate Change*, Uruguay has already submitted two Nationally Determined Contributions to the Paris Agreement. Consistent with the *Helsinki Principles*, the 2020-24 National Budget Law mandated that climate targets be integrated in the planning and design of economic policies and public finances. Together with the creation of the Ministry of Environment, the Coordination Group of the *National Climate Change Response System* has been instrumental for an effective interministerial collaboration and for mainstreaming the climate agenda across sectors and the subnational administrations.[5] Over the past decades, in collaboration with its development partners, Uruguay has developed and tested innovative financial instruments to address climate change, with significative knowledge spillovers at

[4] Primary energy matrix.

[5] The *National Climate Change Response System* was created by the Decree 239-2009.

regional and global scale.[6] Within its country partnership framework with the World Bank, a pilot for a new financing instrument that supports commitments to climate change is being considered.

4. Uruguay has also demonstrated its ability to innovate in the climate finance area with the issuance of its pioneering sustainability-liked bond (SSLB). To overcome the hurdles that limit the mobilization and increase the cost of resources to deliver environmental outcomes, Uruguay in its role of Chair of the WB/IMF Development Committee has advocated for innovative sovereign lending instruments that link financial conditions to a country's performance against climate change commitments. In October 2022, the country made great strides by issuing the first bond to include a two-way coupon-step structure: a step-down if it overperforms on pre-defined key performance indicators (KPIs) or a step-up in case of failure to meet targets. The bond issuance attracted more than 180 investors from Europe, Asia, the United States, and Latin America, and helped broaden the investor base since 21 percent were new holders of Uruguayan debt. The targets contemplated by Uruguay's bonds, aligned with its first NDC, include achieving a reduction in aggregate greenhouse gas emissions, expressed in CO_2 equivalent per real GDP unit, by 2025 compared to 1990 and maintaining or increasing the native forest area covering Uruguay's territory by 2025 compared to 2012. To enhance transparency, the United Nations Development Program will provide an external and independent review on both KPIs.

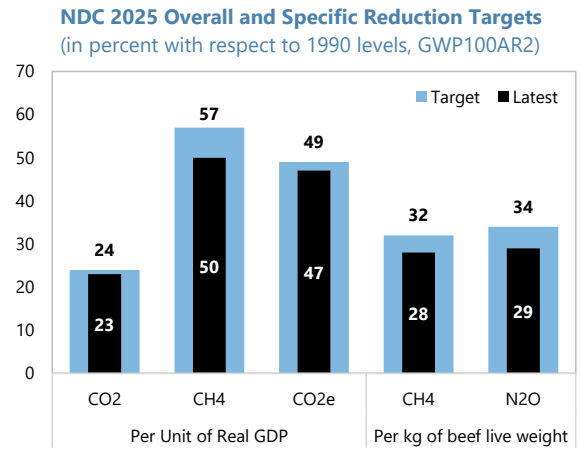
B. Emissions Targets and Outlook

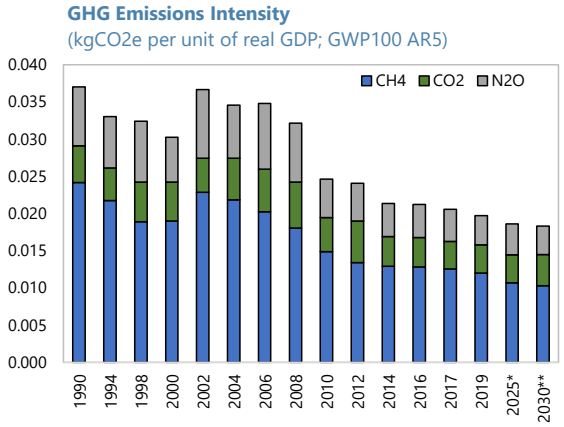
5. Uruguay set ambitious targets in its first Nationally Determined Contribution (NDC), pledging to cut in half its GHG emissions intensity by 2025.[7] As per the first NDC submitted to the United Nations Framework Convention on Climate Change in 2017, the country committed to a 24 percent reduction in carbon dioxide emissions intensity per GDP unit, a 48 percent reduction in nitrous oxide emissions intensity and a 57 percent reduction in methane emissions intensity while maintaining 100 percent of managed planted forests and native forests by 2025. Uruguay also included 2025 agriculture specific NDC commitments such as, reducing the methane emission intensity (per kg of beef live weight) by 32 percent and the nitrous oxide emission intensity by 34 percent with respect to their 1990 reference levels. As per the 2019 GHG emissions inventory, the country appears to be on track to reach its targets in 2025, with progress regularly reported in the NDC progress tracker.[8] Through these commitments, Uruguay is pursuing the goal of becoming one of the world's leading low-emissions food producers, highlighting the importance of environmentally responsible processes and practices in agricultural value chains.

[6] Uruguay buys insurance against the lack of rain.

[7] In Uruguay's first Nationally Determined Contributions (2017), GHG emissions intensity targets are set with 1990 as reference year.

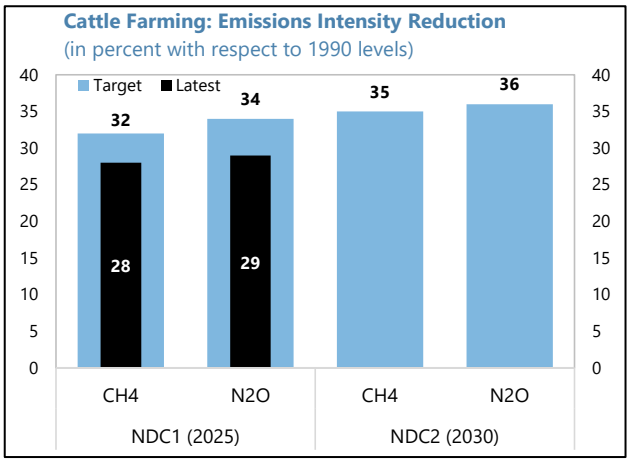
[8] Progress tracker of the Nationally Determined Contribution.





*Refers to the first NDC
**Refers to the second NDC; intensity estimated by staff.
Sources: Ministry of Environment, IMF staff calculations.

6. The authorities have reaffirmed their commitments with the publication of a second NDC and a Long-Term Climate Strategy (2021) with an aspirational carbon dioxide neutrality target by 2050. Uruguay's second NDC (NDC2) builds up on its initial targets for 2025 and sets additional targets for year 2030, guaranteeing the continuity in the reduction of methane and nitrous oxide emissions intensity associated with cattle farming, the country's main source of emissions. The NDC2 also gives prominence to the country's adaptation priorities, which include strengthening climate information systems, promoting new instruments to finance capital expenditure, and integrating the climate change perspective into public planning and regulation, among others. Uruguay's long-term vision is framed in a strategy for a low-emission and climate-resilient economic development, which focuses on enhancing the country's adaptation capacities and decreasing emissions intensity without endangering food production. The gradual decarbonization of the economy jointly with increased forest carbon sequestration would lead to an aspirational CO_2 neutrality by 2050. The issuance of the SSLB showcases the authorities' commitment with the integration of climate and economic policies and with their contributions to global public goods.

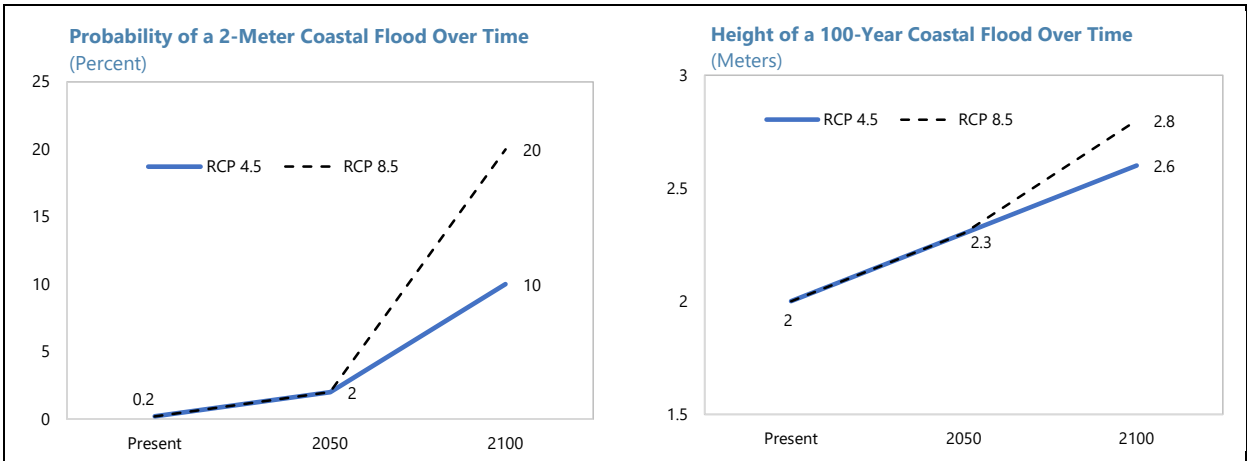


Source: Ministry of Environment.

C. Policies Supporting Climate Change Adaptation

7. Uruguay's exposure to extreme climate events has been increasing, causing substantial economic losses. The authorities estimate average direct and indirect losses from droughts at 383

million and 1.2 billion dollars, respectively, or a total of 2.5 percent of GDP.[9] Rain and floods are also becoming more frequent and intense, forcing vulnerable groups to relocate (3 percent of the population in 2015-19) and impacting livelihoods. Uruguayan agricultural and fishery sectors are increasingly exposed to hydro-meteorological events impacting on crop yields and food production more broadly. Since 1902, the sea level near Montevideo has risen 11 centimeters (cm), of which 2-3 cm increases happened during the last three decades. The results of a climate risk analysis undertaken during the latest FSAP show that extreme coastal flood hazards (i.e. a 2-meter coastal flood) will become more likely and more severe, impacting the populations and threatening the viability of economic activities in Colonia, Canelones, Maldonado, Montevideo, Rocha and San José departments.[10] Recurrent responses to climate shocks have been putting pressure on fiscal space while the materialization of climate physical risks could also pose macro-financial risks, increasing the share of firms and households at risk of default and impacting banks' portfolio quality.



Sources: 2022 FSAP; NAP Coastal Zones; IMF staff calculations.

8. Against this backdrop, adaptation to climate change has become a national priority. In its Adaptation Communications submitted to the UNFCCC, Uruguay has defined specific adaptation contributions, gearing its efforts towards the Global Goal on Adaptation under the Paris Agreement of increasing adaptation capacity, strengthening resilience, and reducing vulnerability. Uruguay has focused its adaptation planning strategy on sectors that, due to their heightened climate vulnerability and economic preponderance, require urgent action. Three National Adaptation Plans (NAPs) have already been prepared and are in course of implementation:[11]

- NAP-Agriculture aims at improving the livelihoods of rural populations through the adoption of sustainable animal and plant production systems that are less vulnerable to the impacts of climate variability and change. Short-term measures include research and development, technology transfer, information systems, climate insurances, resilient infrastructure, promotion of good farming practices (i.e. watershed and soil management), strengthening farmer's

[9] World Bank's Uruguay - Country Partnership Framework FY23-FY27.

[10] NAP Coastal Zones.

[11] Two additional national adaptation plans are being crafted for the energy and health sectors.

networks, among others. Agricultural adaptation creates co-benefits in terms of mitigation, allowing for increase in productivity and reduction in GHG emissions intensity.

- NAP-Cities aims at reducing the vulnerability of communities by incorporating climate risks reduction into the planning for land use and infrastructure and by improving the management systems of public services to ensure continuity under emergency situations. Considering the country's high urban density, it also promotes the adoption of technological solutions to improve buildings climate performance and the integration of urban planning with sustainable urban mobility. Strengthening institutional capacities at national, departmental and local levels is a key component to mainstream adaptive capacity and resilience and to facilitate its articulation into planned development actions.

- NAP-Coastal Zones focuses in increasing the resilience of the Uruguayan coastal zone to average sea level rise and extreme events by incorporating hybrid solutions based on rigid engineering infrastructures together with innovative nature-based solutions to preserve public and private assets. It also promotes the generation of high-resolution databases for monitoring impacts and mapping hazards, vulnerability and risks.

9. Uruguay has made great strides in enhancing its disaster risk preparedness and management. Consistent with the Sendai Framework and articulated with its National Climate Change Policy, in 2020 the *National Policy for Disaster and Emergency Integrated Risk Management* was enacted with the aim of identifying risks, mainstreaming risk management across public policies and minimizing the impacts of disasters. [12] Uruguay has also built considerable expertise in designing contingency mechanisms to mitigate the fiscal impact of disasters. In 2014, in order to reduce budgetary uncertainty and guarantee a reliable source of power to its citizens, the country pioneered a global first weather hedge with the World Bank, in which the state-owned electric company entered into an 18-month weather coverage agreement for 450 million dollars, with a payout triggered by the impact of droughts on hydropower water reservoirs and determined based on the severity of the drought and the oil price levels.[13] The Central Bank of Uruguay, in its *Sustainability Road Map,* as well as in the country's second NDC, has stated its objective to assess the incorporation climate risks into the financial sector regulations while increasing its data collection and exposure modelling capacity in coordination with relevant public agencies. [14]

D. Policies Supporting Climate Change Mitigation

10. Despite its low global emissions, Uruguay was an early adopter of decisive mitigation actions. As such, through structural transformations, the country's economic development model has been shaped into a resilient and low-carbon one. The greening of the economy has also allowed

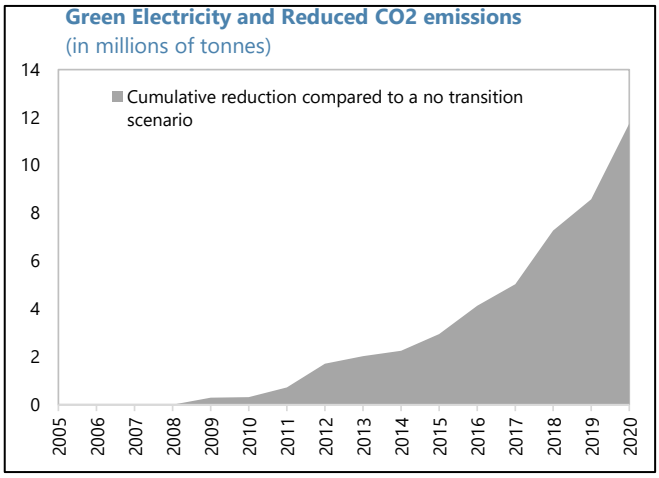
[12] Decree 66/020 (2020).

[13] World Bank Partners with Uruguay to Execute Largest Public Weather and Oil Price Insurance Transaction.

[14] BCU's Hoja de Ruta de Sostenibilidad (2022).

Uruguay to benefit from strategic and competitive advantages, particularly for accessing markets that have toughened their environmental regulations.

11. Uruguay is leading the green energy charge in the region. Historically, the Uruguayan energy system was dependent on thermal and hydroelectric power generation, which left the country vulnerable to adverse weather conditions. Based on a strategic long-term policy (*Energy Policy 2005-2030*) and robust institutional framework, the country shifted its electricity generation matrix to renewable sources, attracting investments rounding US$8 billion during 2010-2016. By 2018, the country was able to generate over 98 percent of all its electricity from renewable sources, primarily wind and hydropower. Uruguay has become one of the world's leading countries in wind energy production, along with Denmark, Ireland and Lithuania, with more than a third of its electricity coming from wind farms. As Uruguay generates a surplus of electricity, it has been able to export energy to Argentina and Brazil. It is estimated that the transition to renewable sources for electricity allowed the country to reduce its CO_2 emissions in 10 million tonnes (2014-20). In 2021, Uruguay's set the foundations for the next phase of decarbonization of its primary energy matrix, developing a National Green Hydrogen Strategy.

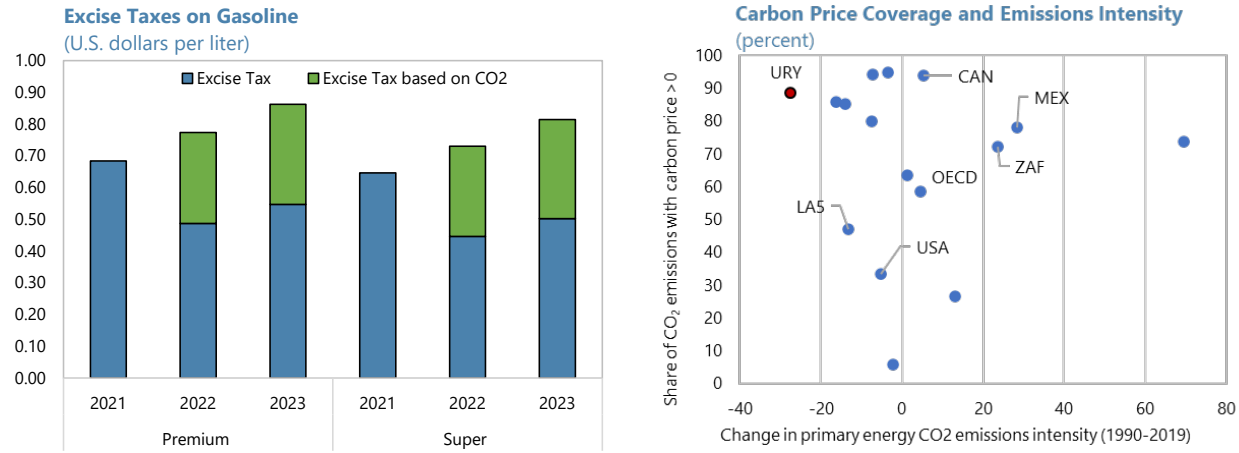


Sources: Ministry of Environment, IMF staff calculations.

12. The decarbonization of the transportation sector will constitute Uruguay's second energy transformation target. Transport accounts for two thirds of the country's oil consumption and is the largest carbon dioxide emitter, constituting 56 percent of total emissions of that gas. Given that the electricity matrix has been practically decarbonized, the authorities are considering *electric mobility* as the way forward. Since 2020, a pilot program for the electrification of public transportation (currently 32 buses) has been implemented by the government in the departments of Montevideo and Canelones. Despite their higher procurement costs, electric buses are attractive when electricity from renewable sources is available at low costs, as is the case in Uruguay, allowing for investment recovery in 4 to 8 years. Furthermore, as batteries are recharged at night, they contribute to reduce the unbalance of day to night demand, a major challenge when renewables increase their share in the energy mix. The increase in transport sector efficiency and the transition to battery-powered electric vehicles is being advanced as part of the *Sustainable Urban Mobility Strategy*.

13. Green hydrogen is an energy vector of great relevance in Uruguay for sectors (long-distance heavy transport, thermal energy, industrial energy, raw) where decarbonization through direct electrical energy is complex or costly. According to the recently launched *Green Hydrogen Roadmap in Uruguay*, by 2030, the country would be able to reach green hydrogen

production costs between 1.2 and 1.5 USD/kgH_2, for a scale above 500 MW. [15] These production costs would allow Uruguay to position itself competitively among net exporters such as Chile, Saudi Arabia, Oman, Namibia or Australia. Drawing on its expertise, Uruguay's state oil and gas firm ANCAP is spearheading the country's efforts to promote and operationalize the green hydrogen strategy. With a medium-term vision, ANCAP is preparing tender rounds to create a maritime hydrogen production hub powered by its significant offshore wind potential. Winning bidders will have up to 10 years to explore and assess the area's potential, with the option of presenting afterwards a full development plan. In the short-term, ANCAP is seeking expressions of interest (early 2023) from firms to produce e-fuels, using carbon captured from biofuel subsidiary ALUR's bioethanol plant.[16] The availability of biogenic CO_2 at constant rate and the possibility to leverage ANCAP's logistics and midstream infrastructure would facilitate the jump-start of onshore green hydrogen projects.



Sources: Ministry of Economy and Finance; WRI CAIT; OECD; IMF staff calculations.

14. As a supplement to Uruguay's wide-ranging structural policies for mitigation, an explicit carbon tax entered into force. When putting in perspective the country's share of CO_2 emissions subject to positive carbon price and its commendable achievements in terms of reduction of the primary energy CO_2 emissions intensity, it becomes apparent that Uruguay's mitigation strategy has relied more on structural changes, which have been effective in decarbonizing the economy. Nonetheless, in 2022 a new pricing mechanism was enacted.[17] With a price set initially at 137 dollars per ton of carbon dioxide, the structure of the excise tax applied to gasolines was modified to include a component linked to CO_2 emissions, covering around 80 percent of Uruguay's vehicle fleet. To further promote energy efficiency, a variety of tax incentives have been established

[15] Uruguay's *Green Hydrogen Roadmap* is published in the Ministry of Industry, Energy and Mining (2022). Green hydrogen is produced by using clean energy from renewable energy sources to split water into two hydrogen atoms and one oxygen atom through a process called electrolysis, in a climate-neutral manner.

[16] Development & Selection of a Power to Liquids/eFuels Project in Uruguay.

[17] Ley de Rendición de Cuentas 19,996.

for purchasing electric or hybrid electric vehicles, which now for example pay an average excise tax of 0 percent and 4 percent, respectively, compared to 29 percent for a traditional gasoline vehicle.[18]

15. Agriculture is being developed through a holistic approach that addresses food security, human health, competitiveness in external markets and environmental sustainability. Climate-smart practices for livestock production and land restoration have been rolled out with the objective of increasing cattle production on natural rangelands, increasing carbon sequestration on grasslands and restoring ecosystems services. As a result, livestock productivity has increased markedly from an average of 78 kg per hectare in 1995-98 to 93 kg per hectare in 2015-18[19]. While the total emissions associated with agricultural production in Uruguay have increased, productivity has been rising faster, resulting in lower emissions intensity. Most of the measures implemented within the climate-smart strategy have had impacts (direct or indirect) on several dimensions (adaptation, mitigation and productivity):

- Integrated pasture management: Improves management of natural pastures and increases the availability of forages during periods of climate variability (adaptation); Reduces emissions and improves quality of livestock fodder (mitigation); Improves the productivity indexes of livestock breeding and rearing (productivity).

- Water management/supply techniques: Ensures water availability during scarcity periods and maintains cattle's physical and productive conditions (adaptation); contributes to lower emissions through improved management of natural pastures (mitigation); Stabilizes number of livestock per area unit, independent of climate (productivity).

- Use of concentrate feeds and feed reserves: Increases food availability during extreme climate conditions (adaptation); Reduces emissions per unit of product (mitigation); Ensures, maintains and improves the productive structure (productivity).

16. Uruguay has taken important step towards its contribution to global public goods. With the support of its development partners, the country has also contributed to the creation of public goods, becoming a global leader in agriculture traceability systems and exporting knowledge to other countries through the South-South Cooperation. Since 2011, through its national system for livestock information, Uruguay became the first country in the Americas with 100 percent traceability of cattle and allowed consumers to know the origin of the beef.[20]

E. The Road Ahead

17. Advancing a climate-resilient economy and improving capacity for disaster risk management and macro-fiscal modeling. As climate hazards have become more intense and

[18] Excise taxes based on 1,000-1,500 cubic centimeters engine capacity vehicles. Other incentives include no import tariffs and discounts on electricity rates for charging stations.

[19] Ministry of Environment (2021).

[20] World Bank (2015).

frequent, adaptation efforts need to be intensified. Building on the progress achieved so far, Uruguay could supplement its risk retention instruments with contingency-specific products for weather-related catastrophes. Drawing on current efforts from the Ministry of Livestock, Agriculture, and Fisheries, risk transfer instruments (i.e., agricultural insurance schemes) could also be scaled up relying on improved climate change information services and geo-referenced crop yields and soil management data. Broadening agro-ecological watershed management practices and advancing into an integrated water resources management would be key for the sustainability and quality of drinking water sources. Based on the national adaptation plans already rolled out, priority investments for climate adaptation should be identified as well as the policy reforms needed to attract private sector resources. The authorities should pursue their efforts to enhance institutional capacity to support the modelling of fiscal impacts from climate change (i.e. coastal floods, excessive rainfall, droughts) and environmental policies, and to integrate them into the national budget.

18. Aligning financing strategies with environmental outcomes. Uruguay's advocacy to adapt multilateral development banks' financing instruments to support national and global commitments on addressing climate change is commendable. As financing needs for building a climate-resilient economy may arise, tapping into innovative sovereign financing instruments (such as *Sustainability-Linked Loans*) that i) embed climate and nature-based indicators and ii) link financial terms to a country's performance against climate change commitments would be key to reduce transition costs and provide incentives for sustainable policymaking. Innovative financing could also help altering risk-return profiles and scaling up private climate finance.

19. Deepening decarbonization and bolstering exports competitiveness. Ahead of tighter environmental regulations in Uruguay's exports markets, climate-smart agriculture practices should be mainstreamed to consolidate the brand the country has built, *Uruguay*, and bolster its exports competitiveness. Drawing on its green electricity matrix, the authorities should pursue their effort to promote the e-mobility transition and the expansion of the charging infrastructure for electric vehicles. As a further greening of the economy could rely on green hydrogen, to encourage private sector investment and mobilize resources, the government should pursue its efforts in planning for the new energy and logistics infrastructures needed, developing the necessary local human capital, and laying out the required regulatory framework.

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